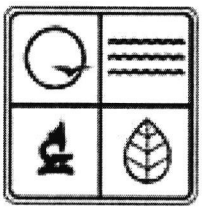
OPERATION & MAINTENANCE INSPECTION REPORT

INLAND REALTY ENTERPRISES, L.L.C.
MARYVILLE, MISSOURI

PREPARED BY



Missouri Department of Natural Resources

CHRISTINE KUMP-MITCHELL, P.E.
HAZARDOUS WASTE PROGRAM

FEBRUARY 2003

STATE OF MISSOURI
Bob Holden, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.state.mo.us

February 19, 2003

CERTIFIED MAIL – 7000 1670 0000 9989 1502
RETURN RECEIPT REQUESTED

Ms. Patricia Murrow
Interim Acting Branch Chief
RCRA Corrective Action
and Permits Branch
U.S. EPA Region VII
Mail Code ARTD/RCAP
901 N. 5th Street
Kansas City, KS 66101

RE: Inland Realty Enterprises, L.L.C., Maryville, Missouri, Operation and Maintenance (O&M) Inspection Report

Dear Ms. Murrow:

The O&M Inspection Report for Inland Realty Enterprises, L.L.C. in Maryville, Missouri, has been completed. A final copy is being transmitted with this letter. This report fulfills the commitment for completion and submission.

If you have any questions, please call Christine Kump-Mitchell, P.E., of my staff at the Missouri Department of Natural Resources, St. Louis Regional Office, 7545 S. Lindbergh, Suite 210, St. Louis, MO 63125, or by phone at (314) 416-2960.

Sincerely,

HAZARDOUS WASTE PROGRAM

R. Bruce Stuart, P.E., R.G.
Chief, Groundwater Unit

RBS:ckm

Enclosure

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MISSOURI DEPARTMENT OF NATURAL RESOURCES
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FEBRUARY 2003

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LIST OF APPENDICIES

LIST OF ACRONYMS

ACL	–	Alternate Concentration Limit
bgs	–	below ground surface
CALM	–	Clean Up Levels for Missouri
cfs	–	cubic feet per second
CME	–	Comprehensive Monitoring Evaluation
cm/sec	–	centimeters per second
department	–	Missouri Department of Natural Resources
EPA	–	United States Environmental Protection Agency
ESP	–	Environmental Services Program
gpm	–	gallons per minute
GSRAD	–	Geological Services and Resource Assessment Division
GTARC	–	Groundwater Target Concentration
GWU	–	Groundwater Unit
HWP	–	Hazardous Waste Program
Inland Realty	–	Inland Realty Enterprises, L.L.C.
KCRO	–	Kansas City Regional Office
MCL	–	Maximum Contaminant Limit
MDOH	–	Missouri Department of Health
OBG	–	O'Brien & Gere Engineers
O&M	–	Operation and Maintenance Inspection
ppb	–	parts per billion
PVC	–	polyvinylchloride
RCRA	–	Resource Conservation and Recovery Act
RIP	–	RCRA Implementation Plan
SAP	–	Sampling and Analysis Plan
TSD	–	Treatment, Storage, and Disposal

1.0 OBJECTIVE AND SCOPE

The State of Missouri's Resource Conservation and Recovery Act (RCRA) program authorization is, in part, contingent on the performance of Comprehensive Groundwater Monitoring Evaluations (CMEs) and Operation and Maintenance (O&M) Inspections at treatment, storage, and disposal (TSD) facilities. The RCRA Implementation Plan (RIP) contains provisions that require a CME or O&M periodically for those hazardous waste land disposal facilities that have implemented a groundwater monitoring program to detect and/or assess groundwater contamination resulting from RCRA-regulated waste management practices. The Groundwater Unit (GWU) of the Missouri Department of Natural Resources' (the department's), Hazardous Waste Program (HWP) is responsible for the preparation of the CME and O&M reports.

The O&M inspection and evaluation concentrates on the facility's ability to collect representative groundwater samples from the existing groundwater monitoring system and the facility's ability to operate and maintain the existing groundwater monitoring system. A secondary objective of the O&M Inspection Report is an evaluation of previous site characterization and all other previous site studies which may affect the facility's ability to:

- Detect potential contaminants in the groundwater;
- Assess the rate of movement of groundwater and/or contamination;
- Assess the concentrations of contamination; and
- Assess the direction of groundwater and/or contaminant flow.

Physical examination of the groundwater monitoring system and observation of the sampling routines at the Inland Realty Enterprises, L.L.C. (Inland Realty) facility in Maryville, Missouri were completed by the MDNR on December 4, 2001. Mr. Kurt Hollman of the department's Geological Services and Resources Assessment Division (GSRAD) and Mr. Larry Lehman of the department's Environmental Services Program (ESP) took part in the inspection. Mr. Bill Wright, with O'Brien & Gere Engineers (OBG), performed sampling on behalf of Inland Realty.

Another objective of this O&M is to provide justification for the department's decision to release Inland Realty from their groundwater monitoring requirements and reduce their post closure period under the facility's Post Closure Permit.

To achieve this objective various information sources were reviewed by the MDNR-HWP. The documents reviewed include:

- Missouri Department of Natural Resources, Comprehensive Monitoring Evaluation, 1988

- RCRA Facility Assessment Report; Jacobs Engineering Group (Inland Realty), 1989
- Missouri Department of Natural Resources, Operation and Maintenance Inspection Report, 1993
- Missouri Department of Natural Resources, Operation and Maintenance Inspection Report, 1997
- Inland Realty Annual Groundwater Monitoring Reports, 1997-2001
- Revised Groundwater Assessment Monitoring Plan and SAP; O'Brien and Gere Engineers, Inc. (Inland Realty), 1999
- Missouri Department of Natural Resources and Inland Realty Correspondence, 1997-2001
- Missouri Department of Natural Resources, HWP RCRA Files for Inland Realty, 1997-2001
- Missouri Department of Natural Resources, DGLS (now GSRAD) Monitoring Well Inspection Report; December 2001
- Missouri Department of Natural Resources, ESP Split Sampling Results/Investigation Report; December 2001

2.0 SITE BACKGROUND

This section provides basic background information on the facility and a historical discussion of the groundwater monitoring program.

2.1 FACILITY LOCATION

The former Inland Realty facility is located one half mile east of the city limits of Maryville, Missouri, at 2500 East First Street. The legal description of the facility is the SE 1/4, SW 1/4, Section 16, T. 64N R. 35W, Maryville Quadrangle, in Nodaway County. A site location map is included in ***Appendix A***. The former Inland Realty facility was leased by Laclede Chain Manufacturing Company in 1984, but long-term monitoring and maintenance of the former RCRA surface impoundment are being managed by Inland Realty, LLC (formerly Nixdorff-Lloyd).

The facility lies just east of the One Hundred and Two River, within the 100-year flood plain. The manufacturing building at the Inland Realty site faces U.S. Highway 136 near the south property line. A shipping and storage warehouse is also located in the main building. The surface impoundment is located several hundred feet from the highway, along the western property border. The majority of the northern half of the site consists of open fields that have been farmed in recent years. A Missouri Department of Transportation facility lies to the west of the Inland Realty property. This facility had historically stockpiled de-icing salt and road tar on a parcel of land adjacent to the Inland Realty property line. The Eveready Battery Company lies to the east of Inland Realty, with a large power substation separating the two facilities. Federal Mogul (formerly Moog Automotive) lies just south of Inland Realty across Highway 136. Federal Mogul operated a surface impoundment (a RCRA-regulated unit) which received waste similar to Inland Realty's RCRA-regulated unit (i.e., high metals content and low pH). Federal Mogul is located hydraulically cross-gradient from Inland Realty. There have not been any releases detected from Federal Mogul's surface impoundment.

2.2 FACILITY OPERATIONS

Inland Realty, LLC, Maryville, Missouri formerly Nixdorff-Lloyd Chain Company, historically manufactured low carbon steel tire chains from 1970 until 1984. The manufacturing building was leased to Laclede Chain Manufacturing Company in 1984. The chains were subject to "pickling" procedures during plating operations. Inland Realty utilized an unlined surface impoundment as a depository for process wastes related to the chain manufacturing operation from the early 1970's until 1981. Principal contributors to the impoundment were wastes from the plating and pickling operations. A summary of the chief waste streams and constituents historically disposed in the impoundment follows:

- Spent pickle liquor, EPA waste #K062. The EPA subsequently delisted K062 wastes in 1984, but due to the corrosivity of the waste containing sulfuric acid, chromium, and lead, it was still considered a characteristic RCRA waste.

- Wastewater treatment sludge from electroplating processes on carbon steel, EPA waste #F006. This waste was toxic due to its cadmium, chromium, nickel, zinc, and cyanide content.

- Caustic stripping and cleaning solution from the electroplating processes, EPA waste #F009. These wastes can be reactive and toxic as a result of complex cyanide content.

2.3 REGULATED UNITS

The former impoundment that received the aforementioned wastes was a single-celled unit with approximate dimensions of 210 X 352 feet. The impoundment had apparently been excavated into the existing alluvial deposits, with the native material being pushed up to form the berms. Due to the nature of the wastes received by the former impoundment and the time of their disposal, the Inland Realty facility was classified as a RCRA Treatment/Storage/Disposal (TSD) facility, with the regulated unit subject to RCRA groundwater monitoring regulations of 40 CFR 265 Subpart F. Inland Realty modified their processes in 1981 so that no further wastes were placed in the lagoon after October 1981. As part of the impoundment closure, the contents of the lagoon were neutralized and dewatered throughout 1987, so that only a sludge layer remained. The sludge was consolidated, stabilized, and placed in the western portion of the impoundment, capping the sludge. In April 1990 the entire impoundment was then backfilled, capped, and regraded to minimize precipitation infiltration through the stabilized sludge as well as preventing erosion of the cap.

In December 1993, the department and the Environmental Protection Agency (EPA) submitted a request for a Part B post-closure application for the former lagoon. The approved post-closure permit was effective March 1999. During permit negotiations between the department, EPA and Inland Realty and pursuant to 40 CFR 270.42, it was determined that Inland Realty could reduce their post-closure care period if groundwater contaminant concentrations did not exceed the groundwater protection standards for a period of three years. On November 5, 2001, Inland Realty submitted a Class 3 Permit Modification requesting reduction of their post-closure care period.

2.4 Groundwater Monitoring System Description

The groundwater monitoring system at Inland Realty was comprised of thirteen wells and four piezometers. Inland Realty installed four groundwater monitoring wells (**GMW #1, GMW #2, GMW #3, and GMW #4**) in the vicinity of the impoundment in 1982. Analytical results from subsequent well samples revealed a statistically significant increase in the RCRA indicator parameters in downgradient well samples. As a consequence, a Groundwater Quality Assessment Plan was formulated, resulting in the placement of eight new monitoring wells (**GMW #2D, GMW #4D, GMW #5S, GMW #5D, GMW #6S, GMW #6D, GMW #7,** and **GMW #8**). In addition, four piezometers (PZ-1 through PZ-4) were installed in 1988 to monitor groundwater elevations.

Following a meeting between Inland Realty and the department's HWP in 1989, Inland Realty reverted back to a detection monitoring program, changing their indicator parameters to site-specific waste constituents and installing two new wells 125 to 150 feet downgradient (**GMW #3S** and **GMW #3D**). An analysis of one downgradient well sample in November 1989 revealed the presence of cyanide, nickel, and zinc contamination, resulting in a reversion back to an assessment monitoring program. Inland Realty installed one new well downgradient in 1990 (**GMW #9**) and plugged and abandoned two wells in 1991 (**GMW #1** & **GMW #8**). The most recent monitoring well program consisted of sampling groundwater monitoring wells **GMW #2S, GMW #2D, GMW #3, GMW #3S, GMW #3D, GMW #4S, GMW #4D, GMW #5S, GMW #5D,** and **GMW #9** semi-annually and sampling groundwater monitoring wells **GMW #6S, GMW #6D,** and **GMW #7** annually.

2.5 Facility Compliance History

The following is a chronology of groundwater-related compliance issues occurring at the Inland Realty facility, pertaining to the RCRA-regulated impoundment. All listings prior to 1997 are contained in the 1997 O&M report, the 1993 O&M report, and 1988 CME report written by MDNR, and are not included in this listing.

03/17/97 Inland Realty submits 1996 Annual Groundwater Monitoring Report to the department.

09/16/97 Inland Realty submits letter to the department's HWP addressing comments generated as a result of the 1997 O&M Inspection Report. Inland Realty adequately addressed all of the departments concerns and comments relating to the O&M.

11/04/97 The department's HWP submits letter notifying Inland Realty of a preliminary decision to issue a Draft Post-Closure Permit to the facility.

12/24/97 Inland Realty submits their comments on the Draft Post-Closure Permit to the department's HWP.

01/20/98 The department's HWP submits letter to the Missouri Department of Health (MDOH) requesting technical assistance reviewing Inland Realty's Risk Assessment and proposed Alternate Concentration Limits (ACLs).

01/27/98 Inland Realty submits 1997 Annual Groundwater Monitoring Report to the department.

01/30/98 The department completes the 1997 Annual Groundwater Monitoring Report Review for Inland Realty.

02/03/98 The department submits letter to Inland Realty regarding response to the departments O&M Inspection Report comments. Inland Realty adequately addressed all of the departments concerns except for disposal of purged water. This issue must be addressed.

02/06/98 Inland Realty submits letter responding to the departments O&M comment regarding Inland Realty's method of purged water disposal. Inland Realty has come to an agreement with Laclede Chain Company (Laclede) to disposed of their purged water in Laclede's wastewater pretreatment system.

06/12/98 Inland Realty submits report entitled "Determination of Risk Based Alternative Concentration Limits" to the department for review and comment.

07/20/98 Inland Realty submits comments to the department regarding the Draft Post-Closure Permit.

10/30/98 Inland Realty submits letter to the department confirming prior phone conversation determining that the first semi-annual sampling event under the Post-Closure Permit will be in November 1998.

11/09/98 Inland Realty submits Draft Revised Ground Water SAP to the department. The SAP was revised to incorporate changes related to implementation of the Post Closure Permit.

11/24/98 The department submits comments on the revised SAP to Inland Realty.

02/22/99 Memorandum from the department's Water Pollution Control Program to the HWP approving the calculated ACLs in place of MCLs for Inland Realty's Post Closure Permit.

03/11/99 The department issues Final Post-Closure Permit to Inland Realty after the required public notice and public comment period.

03/25/99 Inland Realty submits revised Ground Water SAP to the department. The SAP was revised to incorporate the department's comments.

06/28/99 Inland Realty submits 1998 Annual Groundwater Monitoring Report to the department.

07/26/99 The department completes review of the 1998 Annual Groundwater Monitoring Report and review and approval of the 1999 Revised SAP for Inland Realty.

03/08/00 Inland Realty submits 1999 Annual Groundwater Monitoring Report to the department.

07/06/00 The department completes the 1999 Annual Groundwater Monitoring Report Review for Inland Realty.

03/01/01 Inland Realty submits 2000 Annual Groundwater Monitoring Report to the department.

03/07/01 Inland Realty submits letter notifying the department that their contract laboratory has gone out of business and that a new laboratory will be selected. This change will be made in the facility's SAP.

06/04/01 Inland Realty submits letter notifying the department of a change in their contract laboratory to Severn Trent Laboratories.

08/01/01 Inland Realty submits May 2001 Groundwater Monitoring Report to the department.

10/05/01 The department's HWP submits requests to ESP and GSRAD requesting a final O&M Inspection be conducted at the Inland Realty property to confirm the department's decision to release Inland Realty from their groundwater monitoring requirements.

11/05/01 Inland Realty submits a Class 3 Permit Modification request to the department. Inland Realty requests to reduce their Post-Closure Care Period and terminate groundwater monitoring. Their request is based on 3 consecutive years of groundwater sampling under the Post-Closure Permit without exceeding their ACL's.

11/20/01 The department completes the 2000 Annual Groundwater Monitoring Report Review for Inland Realty.

03/03/02 Inland Realty submits notification of groundwater monitoring well abandonment to the department's GSRAD. Inland Realty intends to conduct groundwater monitoring well abandonment in accordance with Missouri Well Regulations at 10 CSR 23.

03/12/02 The department prepares a Draft Class 3 Permit Modification to reduce Inland Realty's post-closure care period and terminate groundwater monitoring. The permit modification must undergo public notice and public comment period prior to being deemed final.

06/17/02 The department grants final approval of the Class 3 Permit Modification to reduce Inland Realty's post-closure care period and terminate groundwater monitoring.

07/09/02 Inland Realty abandons groundwater monitoring wells at the facility.

07/24/02 Inland Realty received certification of monitoring well abandonment from the department's GSRAD.

08/16/02 Inland Realty submits Certification of Completion of Post-Closure Care Period to the department.

09/06/02 Memorandum from the department's HWP to the Kansas City Regional Office (KCRO) requesting a final post closure inspection at Inland Realty.

10/31/02 The department's KCRO submits report of inspection at the Inland Realty closed surface impoundment. The report stated that no unsatisfactory items were observed.

11/12/02 Memorandum from the departments, HWP, Permits Section – Land Disposal Unit to the Financial Assurance and Communications Unit, releasing Inland Realty from financial assurance due to termination of their post-closure permit.

3.0 ENVIRONMENTAL SETTING

3.1 REGIONAL GEOLOGY AND HYDROGEOLOGY

This region of Missouri is part of the Dissected Till Plains physiographic province. Thick deposits of loess and glacial drift ranging from 20 to 230 feet in thickness covered the pre-glacial topography in this area. The buried topography is older, highly complex and largely unrelated to the present one. Present day drainage trends north to south towards the Missouri River. Regional streams and rivers (including the 102 River) have broad, flat floodplains, underfit stream channels, and some roughly parallel buried preglacial channels.

Surficial materials present in the Dissected Till Plains can generally be grouped into several categories including: 1) glacial drift/till deposited during several separate periods of glaciation, 2) loess (wind-blown glacial silt), 3) residual soils, and 4) terrace/alluvial deposits. The engineering properties of these materials vary considerably as a function of physical/chemical composition and distribution. The primary surficial materials of concern at the Inland Realty facility are the alluvium of the One Hundred and Two River and glacial till underlying this alluvium.

The underlying bedrock is of Pennsylvanian Age, comprising the Shawnee Group of the Virgilian Series. This group typically consists of alternating limestone and shale layers with occasional intermittent sandstone layers. This bedrock generally dips to the west-southwest. The bedrock surface represents a buried topographic surface that bears no resemblance to present day topography. Structurally, this area of northwestern Missouri is within the Forest City Basin. The rocks from late Mississippian Age through the Pennsylvanian Age thicken towards the center of the Basin, which is located in the Maryville vicinity. No major faults have been identified in the area, although an anticline structure trending northwest-southeast to the south of Maryville causes local upwarping of the bedrock. At the base of the Ordovician Roubidoux Formation, the dip is to the northwest.

The quality and quantity of groundwater obtained from consolidated aquifers in the region vary considerably. Groundwater obtained from consolidated aquifers in the western portion of the Dissected Till Plains is typically high in iron, bicarbonates, sulfates and sodium; and yields are low (3-30 gpm). In some areas (generally towards the central portion of the Dissected Till Plains), wells completed in Pennsylvanian bedrock are known to produce water of relatively higher quality.

The pre-glacial valleys contain sand and gravel deposits that serve as an important water resource, with maximum well yields ranging from 200-500 gallons per minute. The buried valleys provide the best water yields to wells in unconsolidated aquifers. Recharge for these buried valleys, or channels, includes storm drainage, infiltration through surficial deposits, and recharge ascending from semi-confined bedrock aquifers. Artesian conditions can exist in deeper wells in glacial drift deposits.

In Nodaway County, several water production wells are located in the 102 River alluvium, with productions ranging from 17-25 gallons per minute (GPM). Alluvial deposits of the Nodaway River contain water wells producing from 0-20 gpm and the Platte River alluvium water production rates range from 3-45 gpm.

3.2 SITE-SPECIFIC HYDROGEOLOGY

The upper 25-35 feet of surficial materials beneath the Inland Realty facility consists of alluvial deposits from the 102 River. The upper 10-15 feet of alluvium consists of fine grained, reddish-brown silt and clay exhibiting frequent iron staining. The lower alluvial soils consist of interbedded, fine to coarse-grained sands with traces of gravel. These materials are grayish in color, saturated throughout and become less sorted with depth. Below the coarse grained alluvial deposit lies a glacial till interval consisting of silty, sandy, clay of low permeability with some traces of coarse sand. Most of the glacial till is clay-rich and slowly permeable. Typically, outwash deposits of unconsolidated silt, sand, and gravel underlie the clayey till. Surficial deposits of the till interval consist of a loess layer of soil overlying 10-15 feet of grayish clay. This clay layer can act to perch the water table above the outwash deposits of sand and gravel. The till interval underlying the Inland Realty facility typically reaches 50 feet in thickness, to a total depth of approximately 90 feet.

The potentiometric surface under the Inland Realty facility normally lies five to ten feet below ground surface. Groundwater is found in the alluvium, with the underlying glacial till apparently providing an effective aquitard at the base of the alluvium. In addition, there appears to be a hydraulic separation (as evidenced by water level measurements) between the groundwater in the lower alluvial sand/gravel and shallow groundwater in the upper alluvial silt/clay.

Under normal conditions, shallow groundwater flow is towards the 102 River from either side of the valley. Recharge is primarily from precipitation infiltration, except during extended periods of high river flows which probably tend to reverse the groundwater flow directions near the river on either side. Under these conditions, the reversal of flow does not reach the subsurface of the Inland Realty site, but apparently results in a much smaller flow gradient in the direction of the river. Historical flow data from the 102 River indicates an average flow of 229 cfs and a typical dry-period flow of 20 cfs.

Three drainage ditches traversing the site control surface drainage on the site (***Appendix A***) which lead to the 102 River. These ditches are designed to only carry storm water runoff to the river. Residents of Nodaway County use both the alluvial aquifer and the river for drinking water. The Laclede Chain Manufacturing facility obtains drinking water from the city of Maryville, which draws water from a reservoir fed by the 102 River. Two factory supply water wells were drilled in 1970 and subsequently abandoned in 1988. Two new wells were drilled in 1988 to a depth of 25 and 27 feet, respectively, to obtain process coolant water. These wells pump water on an as-needed basis for the facility, and there is a possibility that they have influenced the shallow groundwater at the facility by inducing a downward flow component from the fine-grained alluvium to the coarse-grained alluvium downgradient from the impoundment. They may also influence the direction of shallow groundwater flow (and, hence, possible contaminant transport) from a due eastward flow to a more southeasterly flow (groundwater contamination is currently confined to the immediate vicinity of the impoundment on the southeast margin).

Area farming and the storage of road de-icing salt and tar upgradient from the facility may have impacted the shallow groundwater quality at Inland Realty. Elevated levels of TOC, specific conductance, and chlorides have been reported in upgradient groundwater samples, when compared with downgradient levels. Levels of nitrates, fluoride, and sulfates (in sampling unimpacted by the Inland Realty facility) generally meet the EPA's Secondary MCLs. Naturally occurring metals in the shallow groundwater appear to include zinc and iron, with lesser amounts of nickel, lead, and chromium.

4.0 OPERATION AND MAINTENANCE INSPECTION

The primary objectives of this section are to determine if:

- Inland Realty's subsurface measurement procedures and groundwater sampling and analysis protocols were capable of yielding reliable, consistent, and representative groundwater samples and hydrologic data during their post-closure permit period; and

- Inland Realty's data evaluations adequately represented the data and were capable of detecting the presence of contamination.

To achieve these objectives, groundwater samples were obtained during the field O&M inspection by both Inland Realty and the department on December 4, 2001. Mr. Larry Lehman (ESP) and Mr. Kurt Hollman (GSRAD) observed Inland Realty's sampling procedures, spilt the groundwater samples, and performed the physical well integrity inspection and water level measurements. Mr. Bill Wright performed the sampling on behalf of Inland Realty.

4.1 GROUNDWATER SAMPLING AND ANALYSIS PLAN

As required by 40 CFR 265 Subpart F, RCRA Land Disposal Facilities such as Inland Realty must develop a Sampling and Analysis Plan (SAP) for the groundwater monitoring wells at the facility. The SAP is written documentation detailing the overall operation of the groundwater monitoring system. The purpose of the SAP is to document the procedures used in sampling and analysis of groundwater monitoring wells such that these procedures are done in a proper and consistent manner regardless of the personnel involved.

Inland Realty's most recent SAP was submitted to the department in March 1999. A copy of this SAP is included as ***Appendix B*** of this report. A worksheet outlining the department's expectations for an adequate SAP was completed for Inland Realty's 1999 SAP and is included as ***Appendix C*** of this report. Inland Realty's SAP contains all of the elements required for an adequate SAP.

4.2 PHYSICAL WELL INTEGRITY INSPECTION

Kurt Hollman of the department's GSRAD performed an inspection of the physical monitoring well integrity at the Inland Realty facility on December 4, 2001. Mr. Hollman audited static water level measurements, total well depth measurements, and well purging procedures by Inland Realty sampling personnel.

Seventeen monitoring wells and piezometers were inspected for physical integrity with regard to surface well seals, inner and outer casings and general well conditions. A copy of the Measurement, Purging and Well Integrity Worksheet completed by GSRAD is included in ***Appendix D.***

Overall, the monitoring well network appeared in sound condition. However, some minor deficiencies were discovered at the site including a cracked well seal at monitoring well **GWM #9** and piezometer **P-1** and a lifted concrete seal at piezometer **P-2**.

Since GSRAD's physical well integrity inspection in December 2001 Inland Realty has been released from their groundwater monitoring program and all monitoring wells have been abandoned. Monitoring well abandonment was completed in accordance with Missouri Well Construction Rules at 10 CSR 23 and certified by the department's GSRAD on July 24, 2002.

4.3 WATER LEVEL MEASUREMENT AUDIT

Static water level measurements and total well depth measurements were audited in five of the regularly sampled monitoring wells. The static water level audit showed close agreement between the department's GSRAD and Inland Realty's measurements. On average, GSRAD measured water levels 0.01 feet shallower than TRW. On average, GSRAD measured total well depth 0.03 feet deeper than Inland Realty. The small disparity between the measurements could be attributed to differences in measurement technique and/or equipment calibration. The consistency in the measurements indicates that accurate water level and total-depth measurements are being made during regularly scheduled sampling events. Comparison of static water level and total well depth measurements are included in ***Table 1***. Potentiometric maps are included in ***Appendix E.***

4.4 FIELD GROUNDWATER SAMPLING AND ANALYSIS PROCEDURES

The field sampling effort and field measurement procedures used by Inland Realty sampling personnel were observed by Mr. Larry Lehman, Environmental Specialist with the department's ESP on December 4, 2001. Bill Wright, hydrogeologist with OBG performed sampling for Inland Realty. A copy of the Groundwater Monitoring Field Audit Report completed by the ESP is included in ***Appendix F.***

Split groundwater samples were also collected for independent analysis by the state. Groundwater monitoring wells that were split sampled were **GMW #4S, GMW #4D, GMW #5S,** and **GMW #9**. Each well has a dedicated PVC bailer, suspended inside the well when not in use, which was used to evacuate the stagnant water.

The facility sampling personnel followed well evacuation procedures as outlined in the facility's "Ground Water Sampling and Analysis Plan" dated March 1999. Static water levels were measured and used to calculate well volumes. One monitoring well was bailed dry after one well volume (**GMW #4S**). The well was allowed sufficient time to recover before sampling.

In wells with sufficient recharge, pH, specific conductance, and temperature measurements were taken after each well total volume was evacuated. Purging continued until two water quality parameters (pH, specific conductance, temperature, and turbidity) were within plus/minus 10% of the preceding value over two successive well volumes. Facility sampling personnel also assured that at least three total well volumes were removed. Three total well volumes were removed from monitoring wells **GMW #4S** and **GMW #5S** and four total well volumes were removed from monitoring well **GMW #9**.

The amount of water purged was measured by pouring it into a 5-gallon graduated bucket. The evacuated water was disposed into the water treatment system at Laclede Chain Company's wastewater treatment system. Descriptions of the physical properties of the water observed in the wells are included in ***Table 2.***

Each well was sampled using the same dedicated bailer that had been used for well evacuation. The facility collected samples for the analyses of cyanide and total metals (cadmium, lead, mercury, chromium, nickel, manganese, and zinc). The ESP field personnel collected split samples for the analysis of total RCRA metals (silver, arsenic, barium, cadmium, chromium, mercury, lead, and selenium).

All samples collected by ESP were given a numbered label and placed on ice in a cooler. A chain-of-custody form was then completed which recorded the label numbers assigned to each sample, the description of the location of the sample collected, the time and date collected, and the parameters to be analyzed. Custody of the samples was maintained by the ESP field personnel until relinquishing them to a sample custodian with the ESP in Jefferson City for analyses.

All of the personal protective equipment and spent disposable sampling equipment generated by the ESP representative were containerized and properly disposed of at the state environmental laboratory in Jefferson City, Missouri.

Overall, Inland Realty's field sampling was accomplished using proper protocols. However, one item warrants discussion:

- During the ESP personnel's field investigations, it was noted that Inland Realty did not collect a duplicate sample during the investigation. The department realizes that this was not a regularly scheduled sampling event and that Inland Realty has collected duplicate samples during previous regularly scheduled sampling events as outlined in their Ground Water Sampling and Analysis Plan. However, facility sampling personnel should ensure that duplicate samples are collected during all sampling investigations.

4.5 SPLIT-SAMPLING RESULTS

Part of an O&M Inspection process involves a comparison between the department's analytical field/laboratory results and those submitted by a facility for the corresponding sampling event. Larry Lehman of the department's ESP split samples with Bill Wright, representing Inland Realty, on December 4, 2001. Samples were obtained by the ESP from monitoring wells **GMW #4S, GMW #4D, GMW #5S,** and **GMW #9** then delivered to the divisional laboratory in Jefferson City, Missouri for analyses. The department analyzed samples for arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Inland Realty analyzed samples for cadmium, chromium, lead, manganese, mercury, nickel, and zinc.

Silver was reported as non-detect by the department, cyanide was reported as non-detect by Inland Realty and, mercury was reported as non-detect by both the department and Inland Realty. Arsenic, barium, and selenium were analyzed by the department and were reported below their respective Maximum Contaminant Levels (MCLs) and Cleanup Levels for Missouri (CALM).

Zinc was non-detect for **GMW #4D, GMW #5S**, and was reported in **GMW #9** at 24.6 parts per billion (ppb), which is below CALM. Zinc was detected in **GMW #4S** at 2020 ppb, which is above the CALM level of 2000 ppb but is well below the facility's ACL of 1,175,000 ppb. Nickel was reported below the CALM Groundwater Target Concentration (GTARC) level of 100 ppb in monitoring wells **GMW #4D, GMW #5S**, and **GMW #9**. Nickel was detected in **GMW #4S** at 848 ppb, which is well below the ACL of 100,000 ppb. Manganese was reported in all four wells sampled. Concentrations ranged from 334 ppb in **GMW #5S** to 73,400 ppb in **GMW #4S**. Concentrations reported were significantly below the ACL of 114,000 ppb for manganese.

The department's and Inland Realty's concentrations for cadmium compare favorably for all four wells. Monitoring wells **GMW #4D, GMW #5D,** and **GMW #9** were all below the CALM GTARC value of 5 ppb for cadmium. Cadmium was detected in **GMW #4S** at 11.5 ppb by the department and 11.7 ppb by Inland Realty. This is well below the facility's ACL of 120 ppb for cadmium.

Total chromium was detected well below the respective ACLs and CALM values in all four wells sampled. Concentrations ranged from non-detect to 46.2 ppb. The department's and Inland Realty's analytical results compared favorably for monitoring wells **GMW #4D, GMW #5S**, and **GMW #9**. The department's analytical result for chromium in **GMW #4S** was 46.2 ppb, while Inland Realty reported 14.7 ppb.

Analyses of total lead showed considerable discrepancies between the department's and Inland Realty's analytical results. The department's analytical results for lead ranged between 22 and 49.8 ppb, while Inland Realty's results ranged from 0.41 to 3 ppb. Inland Realty's results are below CALM GTARC

value of 15 ppb for lead. Both the department's and Inland Realty's analytical results are below the facility's ACLs of 3000 ppb.

The department's laboratory results are included in ***Appendix F.*** Inland Realty's laboratory results are included in ***Appendix G*** and contaminant trend graphs are included in ***Appendix H.*** A tabulated summary comparing the department and Inland Realty's analytical results is included in ***Table 3.***

The department's Environmental Services Program also obtained field measurements for physical parameters of pH, specific conductivity, and temperature. Comparison of the department's and Inland Realty's temperature and pH measurements were in close agreement. The department's specific conductivity measurements ranged from 1460 µmhos in **GMW #9** to 4580 µmhos in MW-5S, while Inland Realty's specific conductivity measurements ranged from 1264 µmhos in **GMW #9** to 2820 µmhos in **GMW #5S**. The difference between the department's and Inland Realty's specific conductivity measurements ranged from 196 µmhos in **GMW #9** to 1769 µmhos in **GMW #5S**. This difference could be related to sampling methodology and equipment calibration. A tabulated summary comparing the department and Inland Realty's field parameters is included in ***Table 4***.

5.0 TECHNICAL GROUNDWATER MONITORING EVALUATION

The goal of this section of an O&M Report is to assess the overall technical sufficiency of the groundwater monitoring program, including any changes to the groundwater monitoring program and/or other field work completed since the last O&M Report.

5.1 ACTIONS RESULTING FROM 1997 O&M REPORT

The 1997 O&M Report conclusions consisted of a summary list of site characterization and groundwater monitoring deficiencies, and a list of requirements necessary to achieve adequacy. The overall O&M conclusions were based on the summary list of deficiencies pertinent to existing site conditions. The majority of the deficiencies identified in the 1997 O&M report were related to the facility's Groundwater Sampling and Analysis Plan (SAP). The facility revised the SAP in response to the O&M and again in 1999 to include changes related to implementation of the Post-Closure Permit. The 1999 SAP addressed all of the departments concerns from the 1997 O&M.

5.2 SITE CHARACTERIZATION

Characterization of the subsurface hydrogeology at the Inland Realty facility has primarily been focused on the two alluvial units: the upper, fine-grained silty clays and the lower, coarse-grained sands and gravel. Groundwater flow directions in both zones are primarily to the east towards the 102 River. Inland Realty has performed in-situ hydraulic conductivity testing of these units, with results showing approximate values of 10^{-3} to 10^{-4} cm/sec for the lower alluvium and 10^{-5} cm/sec for the upper alluvium. This order of magnitude difference in conductivity could be significant enough to consider the two intervals as separate hydraulic zones. This separation has been indicated by potentiometric levels measured in well clusters at the site, with differences of up to three feet seen between wells screened in each zone exclusively.

The 1988 CME Report written by the department's HWP cited a lack of aquitard characterization at the Inland Realty facility, referring specifically to the limey shale bedrock unit. However, in Inland Realty's case, the lower hydraulic confining unit for the shallow groundwater appears to be the clayey glacial till interval. While this interval has not received an extensive hydrogeological investigation to date, the combination of Inland Realty's efforts and subsurface data from the adjacent Moog facility appears sufficient to show that this interval is laterally continuous across the site.

Upward groundwater flow gradients, which may have been preventing the downward migration of contamination at the Inland Realty facility, were documented in the 1988 CME Report, which could account for the relatively

limited amount of data collected for the glacial till interval. If this were the case, dissolved phase contamination could be restricted from deeper migration into both the lower alluvium and the till interval, remaining in the upper, silty clay alluvium. This is generally supported by Inland Realty's quarterly analytical results submitted to MDNR. However, recent potentiometric levels from well clusters **GMW #4 (GMW #4S** and **GMW #4D)** have indicated a relatively strong downward groundwater flow gradient. This trend may be significant to the prediction of contaminant fate and transport. The contaminant plume to date is apparently concentrated around the vicinity of the **GMW #4** cluster. Monitoring well **GMW #9** was placed side-gradient from the **GMW #4** cluster and screened in the lower alluvium.

5.3 ASSESSMENT OF MONITORING WELL NETWORK

The groundwater monitoring program at Nixdorff Lloyd confirmed hazardous waste contamination in samples from well **GMW #4S**, located downgradient from the former impoundment. Hazardous constituents include nickel, chromium, cyanide, cadmium, and lead. Additional indications of releases from the impoundment include significant levels of zinc, manganese and a low pH in samples from **GMW #4S**. The metal contaminants apparently originated from releases to the groundwater during operation of the impoundment. The contaminant plume appears to be concentrated in the upper, fine-grained alluvial material in the area between the former impoundment and the monitoring well **GMW #4** cluster (***Appendix H***).

Monitoring well **GMW #9** was installed to be downgradient of the monitoring well **GMW #4** cluster. However, review of potentiometric maps shows well **GMW #9** to be more side-gradient than downgradient of the monitoring well **GMW #4** cluster.

As previously discussed in this O&M Report, relatively strong downward groundwater flow gradients have been exhibited in the vicinity of the **GMW #4** cluster. Dissolved phase contaminants would be expected to follow the groundwater horizontal and vertical flow components, possibly down into the coarse grained alluvium.

Well clusters **GMW #2 (#2S and #2D), GMW #3 (#3S and #3D),** and **GMW #4 (#4S and #4D)** provide monitoring for potential releases from all downgradient sides of the lagoon in both the upper and lower alluvial flow zones. Well **GMW #3** was added to the well network after the 1988 CME deficiency concerning the "cross-screening of zones and subsequent comparisons of potentiometric surfaces of unlike zones."

Overall, Inland Realty's monitoring well network was adequately placed with respect to possible releases and transport of contaminants from the former impoundment. Further release or migration of contaminants would have been detected by the groundwater monitoring well network.

5.4 ANNUAL GROUNDWATER MONITORING REPORT CONTENT

Groundwater analytical data contained in Inland Realty's 1997-2001 Annual Groundwater Monitoring Reports submitted to the department are included in ***Appendix G*** of this O&M document. The department's HWP reviews the content of each annual groundwater monitoring report submitted by RCRA facilities and subsequently completes a worksheet entitled "Annual Groundwater Report Review." Copies of these worksheets for Inland Realty's 1997-2001 annual reports are contained in ***Appendix I*** of this O&M Report. Inland Realty's Annual Report is a comprehensive document that contains all of the elements that the department considers pertinent to an adequate annual report.

5.5 JUSTIFICATION FOR CESSATION OF GROUNDWATER MONITORING

Inland Realty has conducted groundwater monitoring under interim status since 1982 and then under the RCRA Post-Closure Permit which was issued in March 1999, by the department's HWP.

Pursuant to Condition II-C of the Post-Closure Permit, Inland Reality has completed 3 consecutive years of groundwater without exceeding their alternate concentration limits and has submitted a Class 3 Permit Modification request to be released from groundwater monitoring requirements and reduce the post closure period.

Through careful hydrogeologic characterization, adequate groundwater monitoring well placement, and over ten years of groundwater monitoring and trend graphs Inland Realty has sufficiently demonstrated that the contaminant plume emanating from the surface impoundment has stabilized. Based on the relative immobility of metals and the silty sandy soil, migration of contaminants is anticipated to be minimal. Therefore, the department has agreed to cessation of Inland Realty's groundwater monitoring requirements and reduction of the Post Closure Period pending completion of the Class 3 Permit Modification and public notice requirements.

6.0 CONCLUSIONS

This O&M Inspection report was prepared as part of Missouri's authorization to administer portions of RCRA. The O&M report evaluates the technical and regulatory adequacy of Inland Realty's groundwater monitoring program with respect to the applicable RCRA permitted facility requirements contained in 40 CFR 264 Subpart F and Inland Realty's Post-Closure Permit.

The Sampling and Analysis Plan and field sampling procedures must be designed to assure representative samples are obtained in a precise and consistent manner. Documentation must be adequate to support conclusions regarding the representative nature of the samples. An adequate SAP must be provided to satisfy the regulations as published at 40 CFR 265.90(a), 265.91(a) and 265.93(d)(4). Inland Realty's most recent SAP contains all of the elements required for an adequate SAP.

The field sampling effort and field measurement procedures used by Inland Realty were witnessed by the department's ESP. Sampling procedures must produce samples representative of groundwater beneath the facility as required by 40 CFR 265.91(a)(2), 265.93(d)(4) and 265.93(d)(7). Inland Realty's sampling procedures are sufficient to provide adequate analytical results.

As required by 40 CFR 265.92 (a), monitoring wells must be constructed in a manner that maintains the structural integrity of the wellbore and completed in a manner that enables collection of representative groundwater samples. Twelve wells were inspected for physical integrity with regard to surface well seals, inner and outer casings, and general well condition. Physical well integrity inspection revealed the monitoring well network to be in sound condition.

Since the physical well integrity inspection conducted by the department's GSRAD in December 2001, Inland Realty has been released from their groundwater monitoring program and all monitoring wells have been abandoned. Monitoring well abandonment was completed in accordance with Missouri Well Construction Rules at 10 CSR 23 and certified by the department's GSRAD on July 24, 2002.

The department's ESP and Inland Realty split samples for monitoring wells on December 4, 2001. Field measurements and analytical results between the department and Inland Realty compare favorably, with a few minor discrepancies. These discrepancies can be attributed to sampling methodology and equipment calibration.

The Annual Groundwater Report is a regulatory requirement as described at 40 CFR 265.94. The MDNR reviews the content of each annual groundwater monitoring report submitted by RCRA facilities and subsequently completes a worksheet entitled Annual Groundwater Report Review." Inland Realty's Annual Groundwater Reports included all of the elements the department deems necessary for an adequate annual report.

Inland Reality has completed 3 consecutive years of groundwater monitoring without exceeding their alternate concentration limits. Thus, Inland Realty has submitted a Class 3 Permit Modification request to be released from groundwater monitoring requirements and reduce the post closure period.

Through careful hydrogeologic characterization, adequate groundwater monitoring well placement, and over ten years of groundwater monitoring and trend graphs Inland Realty has sufficiently demonstrated that the contaminant plume emanating from the surface impoundment has stabilized. Based on the relative immobility of metals and the silty sandy soil, migration of contaminants is anticipated to be minimal.

Therefore, pursuant to Condition II-C of the Post-Closure Permit, the department agrees to cessation of Inland Realty's groundwater monitoring requirements and reduction of the Post Closure Period pending completion of the Class 3 Permit Modification and public notice requirements.

7.0 REFERENCES

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TABLE 1
MISSOURI DEPARTMENT OF NATURAL RESOURCES AND INLAND REALTY
WATER LEVEL MEASUREMENT COMPARISON

Well Number	Depth to Water (ft)		Depth to Well Bottom (ft)	
	GSRAD	Inland Realty	GSRAD	Inland Realty
GMW #5S	8.92	8.91	23.86	23.82
GMW #5D	11.56	11.56	37.77	37.76
GMW #9	6.90	6.91	30.16	30.17
GMW #4S	7.18	7.19	20.46	20.38
GMW #4D	8.55	8.55	37.10	37.09

TABLE 2
PHYSICAL PROPERTIES OF WATER SAMPLES COLLECTED FROM INLAND REALTY

Well Number	GMW #4D	GMW #4S	GMW #5S	GMW #9
Color	Clear	Light Brown	Clear	Clear
Odor	None	None	None	None
Oil/Grease	None	None	None	None
Turbidity	Low	Low	Low	Low

TABLE 3
MISSOURI DEPARTMENT OF NATURAL RESOURCES AND INLAND REALTY
SPLIT SAMPLING COMPARISON

Well Number	GMW #4D		GMW #4S		GMW #5S			GMW #9		CALM	ACLs
	ESP	Inland	ESP	Inland	ESP	Duplicate	Inland	ESP	Inland		
Arsenic	3.9	NA	<1.2	NA	3.2	2.9	NA	3.4	NA	50	---
Barium	78	NA	57.7	NA	479	438	NA	674	NA	2,000	---
Cadmium	<1	<5	11.5	11.7	1.47	1.04	0.83	<1	<5	5	120
Chromium	<2.5	1.2	46.2	14.7	<2.5	<2.5	3.5	7.08	4.9	100	49,000
Cyanide	NA	<5	NA	<5	NA	NA	<5	NA	<5	200	40,000
Lead	27.6	0.64	49.8	1.4	26.7	28.3	0.41	22	3	15	3,000
Manganese	NA	1,880	NA	73,400	NA	NA	334	NA	1,070	50	114,000
Mercury	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	2	370
Nickel	NA	10.2	NA	848	NA	NA	27	NA	11	100	10,000
Selenium	1.2	NA	2.4	NA	1.4	1.2	NA	1.1	NA	50	---
Silver	<5	NA	<5	NA	<5	<5	NA	<5	NA	100	---
Zinc	NA	<10	NA	2,020	NA	NA	<10	NA	24.6	2,000	1,175,000

* NOTE: ALL DATA REPORTED IN ppb (µg/ml)
NA – Denotes Not Analyzed

TABLE 4
MISSOURI DEPARTMENT OF NATURAL RESOURCES AND INLAND REALTY
FIELD PARAMETER COMPARISON

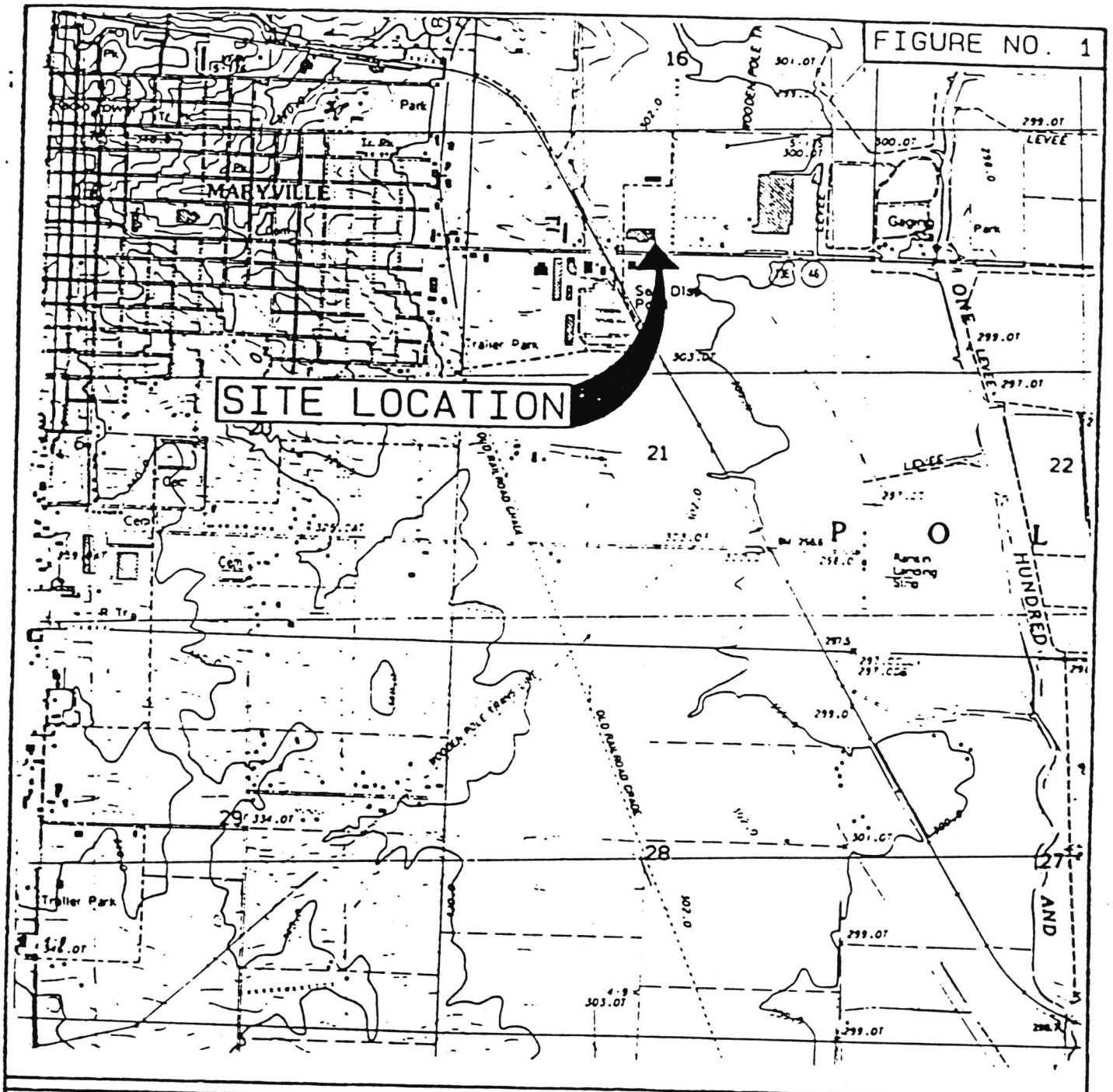
Well Number	GMW #4D		GMW #4S		GMW #5S			GMW #9	
	ESP	Inland	ESP	Inland	ESP	Duplicate	Inland	ESP	Inland
pH	6.32	5.78	6.05	5.78	6.31	6.31	6.36	6.32	5.94
Temp °C	14	15.1	16	16.7	15	15	16.5	17	17.2
Specific Conductivity (µmhos)	2110	1553	3660	2650	4580	4580	2820	1460	1264
Turbidity (NTU)	NR	11.7	NR	28.4	NR	NR	36.4	NR	60.0

NR – Denotes Not Reported

APPENDIX A

LOCATION & SITE MAPS

FIGURE NO. 1



NIXDORFF-LLOYD CHAIN COMPANY
MARYVILLE, MISSOURI

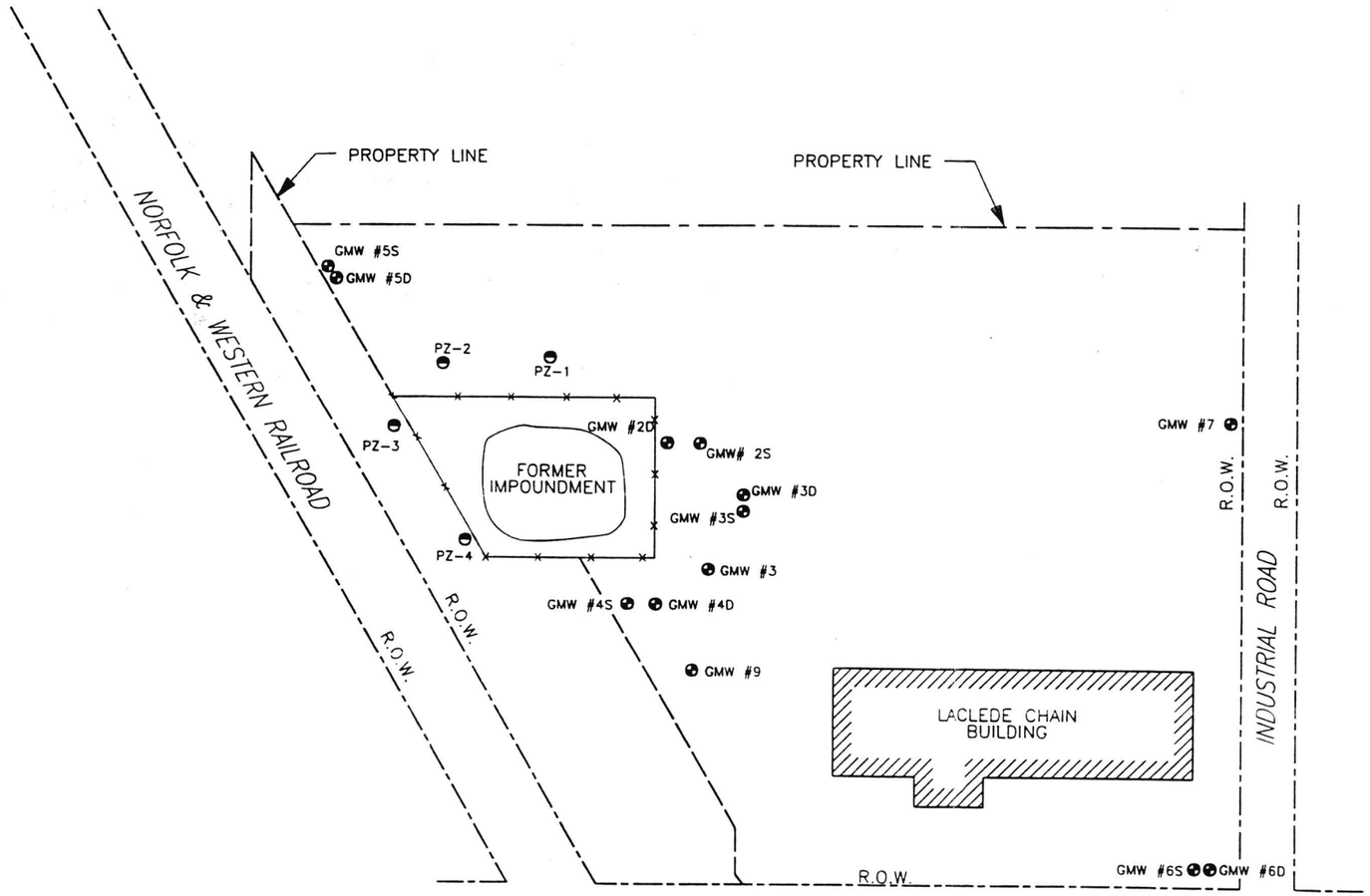
TOPOGRAPHIC SITE LOCATION MAP

ADAPTED FROM U.S.G.S. (7.5 MIN)
MARYVILLE EAST QUADRANGLE
MISSOURI-NODAWAY CO.: 1985
SCALE 1" = 2,000'
CONTOUR INTERVAL 4 METERS

BLANK.SITE.MAP

O'BRIEN & GERE ENGINEERS, INC.

FIGURE 1



LEGEND

- GROUND WATER MONITORING WELL
- PIEZOMETER

INLAND REALTY COMPANY
MARYVILLE, MISSOURI

GROUND WATER MONITORING WELL LOCATION PLAN

5/4/99
3050.005-109F

O'BRIEN & GERE ENGINEERS INC.

DWG PATH: ...JECTS\3050005\DW

PLOT 5/4/99

APPENDIX B

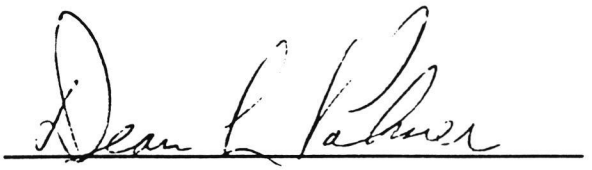
SAMPLING & ANALYSIS PLAN

3050.005

WORK PLAN

Ground Water Sampling and Analysis Plan

Inland Realty Company
Maryville, Missouri



Dean L. Palmer, PE
Vice President

March 1999

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Located at the end of the report

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1. Objective

The purpose of this Ground Water Sampling and Analysis Plan (SAP) is to provide information on the procedures and techniques used in conducting ground water sampling, analysis, and monitoring activities at the Inland Realty Company site (Figure 1) in Maryville, Missouri. This SAP has been developed to meet the regulatory requirements contained in 40 CFR, Part 264, Subpart F and conditions described in Missouri Hazardous Waste Management Facility Permit Part I (Permit Number MOD099238784).

The Ground Water Monitoring and Compliance Monitoring Program, as described in Special Permit Condition II, consists of semi-annual ground water sampling and analyses, semi-annual ground water elevation measurements, and comparison of analytical data to permit-established Ground Water Protection Standards (GPS). The first sampling event under this SAP will be the first regularly scheduled sampling event following approval of this draft SAP. This SAP is a revision of the previous SAP dated August 1997.

2. Ground water compliance monitoring plan

This chapter describes the ground water monitoring program to be implemented at the Inland Realty Company property in Maryville, Missouri (Figure 2). The purpose of this program is continued assessment of the ground water quality at the site during the permit compliance period. If three consecutive years of semi-annual sampling indicates no exceedences of the permit-established GPS, listed in Table I of the Permit, the permittee may request that ground water sampling be discontinued. The current ground water monitoring network has been deemed to be adequate to be used to monitor ground water quality and to be able to detect whether constituents of concern are migrating downgradient of the property.

2.1. Monitoring wells

The Compliance Monitoring Program ground water monitoring well network consists of thirteen ground water monitoring wells as shown on Figure 2. The following monitoring wells have been selected as point of compliance (effectiveness) wells and will be sampled semi-annually: GMW #2S, GMW #2D, GMW #3, GMW #3S, GMW #3D, GMW #4S, GMW #4D, GMW #5S, and GMW #5D. The following wells complete the monitoring well network and will be sampled annually: GMW #6S, GMW #6D, GMW #7, and GMW #9.

Additional effectiveness wells may be installed during the compliance period, if necessary, to meet the requirements of 40 CFR 264 Subpart F. Changes to the list of the effectiveness wells are subject to modification in accordance with 40 CFR 270.42 and are subject to Missouri Department of Natural Resources (MDNR) approval. Within 30 days of written MDNR approval, a revised SAP incorporating the approved changes will be submitted to the MDNR.

Static ground water elevations will be measured on a semi-annual basis for the compliance monitoring well network and the four piezometers.

2.2. Monitoring well system inspection

During each ground water sampling event, a monitoring well system inspection will be performed. The ongoing inspection program will evaluate the general condition of the monitoring well system in order to recommend and implement remedial/rehabilitation measures, if necessary. This information will be included on the Field Sampling Log that includes a monitoring well integrity checklist, a copy of which is included as Appendix A. In addition, the total depth of the monitoring wells will be measured once a year to assess whether siltation is occurring. Wells that exhibit variations in total depth of greater than 5% of total screen length (an indication of sediment accumulation within the wellbore) will be redeveloped. Well redevelopment will be accomplished using bailing or low-yield pumping methods. Successful rehabilitation will be documented by a total well depth measurement that demonstrates minimal well screen occlusion (ideally zero).

Monitoring wells which are assessed to have been damaged or to have damaged surface seals will have repairs undertaken within 7 days and will be restored as follows:

- Surface seals and protective covers will be removed. Precautions will be taken not to disturb the well casing of integrity of the monitoring well.

- A cement/bentonite grout will be used to seal the annulus to just below the frost line. At that point, a continuously poured concrete pad of expansive cement will be emplaced around the well casing. The pad will be a minimum of 4 inches thick and extend outward at least 1.5 ft.

- Upon completion of the well repairs, the top of each casing will be resurveyed to verify that the work efforts have not resulted in the displacement of these casings.

- If it is assessed that the integrity of the monitoring well installation has been compromised and rehabilitation efforts connect be successfully implemented, a replacement well will be installed and/or the well will be abandoned according to state regulations after concurrence with MDNR.

MDNR will be notified at least five days in advance of construction or modification of the ground water monitoring system, as required by Special

Permit Condition II.D.5. Replacement of an existing well that has been damaged or rendered inoperable without change to location, design, or well depth requires a Class I permit modification.

2.3. Ground water monitoring well abandonment/installation

A damaged monitoring well which cannot be repaired or restored will be replaced with a new monitoring well. The abandoned monitoring well will be sealed in accordance with Missouri regulation 10 CSR 23, Chapter 4. Documentation of the methods pertaining to well plugging and abandonment and well abandonment registration forms will be submitted to the MDNR, Division of Geology and Land Survey (DGLS). A copy of the well registration form and registration acceptance will be included as part of the Annual Ground Water Compliance Monitoring Report (Special Permit Condition II.F). Any change in the number of wells to be monitored requires a Class II Permit Modification, in accordance with 40 CFR 270.42.

Monitoring well replacement installation will be completed using conventional hollow-stem auger drilling methods. New monitoring wells will be installed in accordance with 10 CSR 23, Chapter 4. Split-spoon soil samples will be collected every 2 ft or change in formation, according to ASTM Method D1586.

The monitoring well will be constructed of a 10-ft section of 2-inch inner diameter (ID), manufactured 0.010-inch slotted polyvinyl chloride (PVC) well screen, and appropriate lengths of compatible 2-inch ID, solid, threaded, flush-joint PVC riser pipe. Prior to installation, well materials that have not been pre-cleaned will be steam-cleaned to remove dirt, grease, oil, or other potential contaminants which may have come in contact with the materials during transport.

The 10-ft well screen section will be installed to intersect the defined permeable zone, but not to extend into the overlying silt and clay or the underlying till confining layer. A clean, washed, graded sand pack will be placed around the well screen and extend approximately two feet above the screen top. A minimum of 2 ft of a bentonite seal will then be emplaced above the sand pack and the remaining annular space filled with bentonite/cement grout via a tremie line with horizontal discharge outlets. Sufficient time will be allowed to hydrate the bentonite pellets prior to grouting the well annulus. The minimum recommended time for this to occur is 4 to 6 hr within a

saturated zone uld the seal be installed in the vadose zone, clean tap water will be adde the wellbore annulus as required to promote bentonite hydration. Subsequent to well installation, a protective steel casing with locking cap will be placed over each well and will be securely set in concrete. Holes will be drilled into the sides of the base of the steel casing to allow for drainage.

Drilling equipment and associated tools, including augers, drill rods, sampling equipment, wrenches, etc., having contacted potentially impacted materials will be decontaminated using a portable pressurized steam-cleaning unit. Split-barrel samplers will be cleaned using a detergent (Alconox type) wash and clean water rinse after each sampling effort.

Subsequent to installation, the new monitoring wells will be developed using bailer or low-yield pumping methods. Each well will be developed until a relatively sediment-free ground water sample can be obtained. Following well installation and development, a field instrument survey will be performed by a registered surveyor to establish the location, top of casing elevation, and ground elevation for the newly installed monitoring wells.

For reference, copies of the boring logs and well construction details for the current monitoring well network are included in the SAP as Appendix B.

As required in Special Permit Condition II.D.5., the MDNR will be notified at least five days in advance of conducting well abandonment or new well installation . New monitoring wells will be sampled no later than the next regularly scheduled sampling event following installation.

2.4. 5-yr sampling event

As described in Special Permit Condition II.E.7, five years after the issuance of the permit, two ground water monitoring wells historically exhibiting impact will be sampled for 40 CFR 264, Appendix IX volatile organic compounds (VOCs). The analyses will be used to evaluate if additional constituents are detected that may be attributed to the former impoundment. If additional constituents are detected and confirmed by additional sampling, a Class 1 permit modification will be proposed in accordance with 40 CFR 270.42. The modification will propose the addition of the new hazardous constituents to the compliance monitoring program.

3. Compliance monitoring program sampling procedures

3.1. Ground water sampling schedule

Ground water monitoring wells shall be sampled in accordance with the schedule in Special Permit Condition II.E., Table II. Analytical detection limits will achieve the limits listed in Table I of the permit. Ground water laboratory analytical parameters are:

Cadmium (Cd)	Chromium (Cr) III
Chromium (Cr) VI	Cyanide (CN)
Lead (Pb)	Manganese (Mn)
Mercury (Hg)	Nickel (Ni)
Zinc (Zn)	

The concentration of chromium III will be calculated by subtracting the concentration of chromium VI from the total chromium concentration. pH, specific conductance, static ground water elevation, temperature, and total well depth will be measured in the field.

The ground water monitoring wells will be sampled according to the schedule below:

Well ID	Frequency	Well ID	Frequency
GMW #2S	Semi-annually	GMW #6S	Annually
GMW #2D	Semi-annually	GMW #6D	Annually
GMW #3	Semi-annually	GMW #7	Annually
GMW #3S	Semi-annually	GMW #9	Annually
GMW #3D	Semi-annually		
GMW #4S	Semi-annually		
GMW #4D	Semi-annually		
GMW #5S	Semi-annually		
GMW #5D	Semi-annually		

Appendix IX, 40 CFR 264, VOC analysis will be performed every five years. Samples for Appendix IX analysis will be collected from GMW #4S and GMW #4D.

3.2. Pre-sampling procedures

As part of each sampling event, the following steps will be taken by personnel responsible for sampling:

- Review the sampling procedures and Health and Safety Plan as outlined in Appendix C.
- Obtain appropriate containers for sample collection. The type and quantities of containers will be identified based on the laboratory analyses to be performed as outlined on the chain of custody form contained in Appendix D.
- Examine sampler, bottles, and preservatives; contact laboratory immediately if any problems are discovered.
- Confirm sample delivery time and method of sample shipment with the laboratory.
- Assemble and inspect field equipment to be used for sample collection; verify that equipment is clean and in proper working order.
- Calibrate field instruments and/or meters to manufacturer's specifications. Specific conductivity, pH, and turbidity meters will be calibrated to known calibration standard solutions. Re-check calibration prior to sampling each well. Calibration activities will be recorded on the Ground Water Sampling Field Log.
- Establish well location and well identification.
- Obtain necessary keys for wells or gates.
- Examine each well for damage, tampering, erosion around the well casing, etc., and note on the Ground Water Sampling Field Log.

- Place clean plastic sheeting around the well to provide a barrier between the surrounding ground surface and sampling equipment used.

- Decontaminate water level indicators and measuring tapes used in the well by thoroughly wiping with a distilled water-soaked, clean paper towel. Rinse with distilled water.

- Open the well cap and make a visual check down the casing, noting the condition of the well casing and whether a permanent ground water level reference point has been established on the casing. Note observations on the Ground Water Sampling Field Log.

3.3. Water level measurements

Prior to initiating ground water sampling, water elevations will be measured in each of the wells and the four piezometers on-site. Ground water level measurements will be collected as follows:

- A graduated measuring tape will be used to measure the depth to water from the top-of-casing reference point. Record the depth on the Ground Water Sampling Field Log. This procedure will also be used to measure the depth of the well. Measurements shall be made to the nearest 0.01 ft.

- After establishing the water level, the volume of water within the well will be calculated.

3.4. Record keeping

Prior to initiating the well purging process, the following information should be recorded in a field log book and/or on the Ground Water Sampling Field Log:

- Well number
- Day/date/time
- Weather conditions
- Condition of the well and surrounding area
- Sampling team members

- Instrument calibration information
- Water level prior to purging
- Depth to the bottom of the well
- Volume of water to be purged
- Physical properties of evacuated water: color, odor, turbidity, presence of non-aqueous phase liquids
- Deviations from planned sampling methodology.

3.5. Labels

Sampling jar labels should be filled out to include:

- Sample number identification
- Initials of sampler
- Date and time sample collected
- Analytical parameters
- Site location
- Preservative
- Client name.

3.6. Purging the well

Prior to sampling, the wells will be purged to remove the standing water column from the well casing. Where recharge is sufficient, a minimum of three well volumes of water will be removed from each well. A well volume of water is calculated using the following formula:

$$V = (0.49)(h)(r^2)$$

where:

- V = standing water volume in gallons to be purged
- (0.49) is a correction factor which includes conversion from inches to feet and the fact that three volumes are to be purged

- h = linear feet of standing water in the casing
- r^2 = inside radius of well in inches, squared.

3.6.1. Bailer method

- Attach a new, clean length of dedicated polypropylene rope to the dedicated bailer. Lower the bailer to the bottom of the well and agitate the bailer up and down to suspend fine-grained materials settled in the well, thereby facilitating the removal of these materials.
- Initiate bailing the well from the well bottom. Ground water should be poured from the bailer into a graduated pail to measure the quantity of water removed from the well.
- Continue bailing the well throughout the water column and from the bottom until a sufficient volume of ground water in the well has been removed or until the well is bailed dry. If the well is bailed dry, allow sufficient time for the well to recover before proceeding with the next step. Record this information on the Ground Water Sampling Field Log.
- In wells which exhibit sufficient recharge, pH, specific conductance, and temperature measurements will be collected from the initial bailer of ground water and after removing each well volume. Purging will continue until two of the well volume measurements are within ±10% of the preceding value over two successive well volumes and after at least three total well volumes have been removed. Record this information on the Ground Water Sampling Field Log.
- The water removed during purging or possible decontamination procedures will be discharged to the Laclede Chain Company wastewater pretreatment system.

3.7. Sampling protocols

Each well will be sampled according to the following procedures:

- Remove the sampling bottles from their transport containers and prepare the bottles for receiving samples. Inspect all labels to facilitate proper

sample identification. Sample bottles will be kept cool with their caps on until they are ready to receive samples.

- To minimize agitation of the water in the well, initiate sampling by lowering the dedicated bailer slowly into the well, making certain to submerge it only far enough to fill it completely.

- If the sample bottle cannot be filled quickly, it will be kept cool with the cap on until it is filled. Sample containers will be preserved appropriately (nitric acid for metals and sodium hydroxide for cyanide).

- Return each sample bottle to its proper transport container. Preserve samples by reducing the temperature within the containers to approximately 4° Celsius using blue ice or wet ice. Samples must not be allowed to freeze.

- When samples are to be split with the regulatory agency or other party, each bailer-full of water should be split between both parties' jars, one jar type at a time.

- Record the physical appearance of the ground water observed during sampling on the Ground Water Sampling Field Log.

- Replace the well cap and lock the well protection assembly before leaving the well location.

- Begin the chain of custody record (Appendix D).

To make more efficient use of sampling time, monitoring wells that are purged and sampled prior to 12.01 p.m. will not have their hexavalent chromium sample collection until after 12:01 p.m. of the same day. This will allow as much time as possible for the samples to be delivered to the laboratory within the hexavalent chromium 24-hr holding time and will allow the sampler to complete the day's sampling early enough to deliver the samples to the overnight delivery service. It will not be necessary to remove additional quantities of water form the ground water monitoring wells prior to collecting the hexavalent chromium samples.

3.8. Sample control and chain of custody

- For proper identification in the field and proper tracking in the laboratory, samples will be labeled in a clear and consistent fashion.
- Sample labels will be waterproof, or sample jars will be sealed in plastic bags.
- Field personnel will maintain a sampling log sheet.
- The sampling field log sheets will contain sufficient information to allow reconstruction of the sample collection and handling procedures at a later time.
- Each ground water monitoring well will have a corresponding sample log sheet which includes:
    - Sample identification number
    - Well location and number
    - Date and time
    - Sampler's name
    - Sample type (composite or grab)
    - Analysis for which sample was collected
    - Field parameters including pH, temperature, and specific conductance
    - Method of preservation
    - Additional comments as necessary.
- Each sample will have a corresponding entry on a chain of custody record (Appendix D). The record will include:
    - Site name
    - Sample identification number
    - Sample type (*i.e.*, water, soil, sludge)
    - Date and time of collection
    - Number and type of containers
    - Preservatives
    - Required analyses
    - Signature block for custody transfer.

3.9. Sample containers

Sample containers will be pre-cleaned and contaminant-free. The lab jar supplier will have pre-cleaned the sampling jars according to USEPA-approved cleaning methods. The analytical lab purchases the pre-cleaned bottles from a reputable laboratory supply vendor. Sample containers will be pre-preserved by the lab.

3.10. Sampling waste disposal

During ground water sampling, potentially impacted sampling equipment (glassware) and disposable supplies (plastic sheeting, rope, latex gloves, and paper towels) will be generated. Broken glassware will be rinsed with distilled water, placed in plastic bags, and disposed in the Laclede Chain general refuse container. The rinse water will be contained in a bucket and disposed of in the Laclede Chain wastewater pretreatment plant. Disposables will be placed into plastic trash bags and placed into the Laclede Chain general refuse container for disposal. Clothing that has been splashed with ground water will be placed into plastic bags at the end of the sampling event. The clothing can be washed as long as the splashed clothing is segregated and washed separately from normal laundry. If disposable coveralls are worn, they will be placed into plastic bags and placed into the Laclede Chain general plant refuse container for disposal.

5. Laboratory QA/QC procedures

It is intended that American Technical and Analytical Services, Inc. (ATAS) of Maryland Heights, Missouri will be performing the laboratory analytical work for the ground water samples collected. They reportedly have an extensive QA/QC program, following the procedures established in SW846, as well as those outlined in the following sections and illustrated on Figure 3.

5.1. Inter- and intra-laboratory programs

The laboratory participates in inter-laboratory programs through the certification programs of various states. Intra-laboratory programs include the analysis of duplicates, spikes, surrogate spikes, and reference samples. This information will be provided along with the regular quarterly ground water data submittals.

In quality control, "precision" means the agreement within a set of replicate results. Precision is described in terms of deviation, variance, or range. The term "accuracy" refers to the nearness of the analytical results to the true value. It is described in terms of error, bias, or percent recovery. Together with the samples analyzed in the laboratory, the staff uses duplicate samples, spiked samples, blanks, and samples with a predetermined concentration of the parameter called the "reference standard" to judge precision and accuracy.

A "spiked sample" is one which has a specific amount of the parameter added to a sample already analyzed. The accuracy of an analytical method is established by the recovery of the analyte from the sample matrix. Following analysis of the spiked sample, the technician records the total amount of the parameter. The concentration of the parameter that is found in the spiked sample is used to calculate recoveries which are compared to the control limits in the database. Analyses found within the control limits are accepted as valid. If the value is found to be beyond these limits, the analysis will be rejected and the sample will be re-analyzed.

A sample can be split, and multiple analyses can be performed. These are "laboratory duplicate samples," and they indicate the precision of the analytical method -- the ability to reproduce a result while performing any given procedure.

Many samples are analyzed in the present of reagents. A "blank" sample is distilled water into which the reagents have been added. In analyzing a blank, no detected concentration of the parameter should be measured. If the parameter is measured, the analysis is deemed contaminated. Whenever contamination is found through the analysis of blanks, the laboratory searches for its source. Detected contamination is recorded, and those records are used to correct analytical values or, if necessary, to reject a set of analyses.

5.2. Error detection

There are two categories of error which may occur in analytical programs -- systematic and random. Systematic errors are caused by an incorrect or faulty procedures; these errors produce inaccurate results. With a rigorous QA/QC program, these errors are detected, and the analyst is able to make the necessary corrections.

There can be many causes of random errors, and they may relate to the skill of the analyst. Random errors affect precision more than they affect accuracy, and they are difficult to correct. The QC program can assess the magnitude of error, and it can assign a level of confidence to the data. A low level of confidence indicates a need for additional training of the analyst.

5.3. Laboratory equipment decontamination

The lab performs normal maintenance and cleaning of its laboratory equipment on a daily basis. These activities are performed according to the manufacturer's recommendations. Contaminated laboratory equipment would be detected in the analysis of the method blanks. To address detected concentrations in the method blanks, the laboratory re-analyzes the entire batch after the equipment has been systematically cleaned.

5.4. Data management

The data gathered in the laboratory's QA/QC program result in a large number of records. The laboratory employs the methods described below to order and analyze the data. This system facilitates the documentation of each step of sample handling. The day-to-day efforts of the QA/QC program build a "QA/QC model." This model provides detailed control charts and control limits which measure the performance of the laboratory daily. Examples of control charts are listed on Figures 3 and 4; the daily quality control efforts to ascertain quality assurance are summarized on Figure 5.

The data management system begins to track a sample as it enters the laboratory. Each sample is tagged with a unique identification number. A computer-managed coding format is used to categorize samples. This format can be adapted to every analytical investigation. It then serves as the basis for storage and retrieval of data.

Any measurement which is made repeatedly will display a number of different results. Because not all the measurements are likely to be the same, they will be distributed typically close to the mean or average. The overall distribution of results will be that of the normal distribution with the familiar bell shape. The QA/QC program monitors the mean and the standard deviation from the mean. Control limits (Figures 4 and 5) are calculated at three standard deviations from the mean (99.9% confidence level of the normal distribution).

As quality control data are collected, the exact distribution of the data is established. Statistical methods evaluate the quality of the data by calculating control limits and warning limits for each parameter by matrix. The warning limit is defined as two standard deviations on either side of the mean; this provides a 95% confidence level. The control limit refers to an interval of three standard deviations on either side of the mean and provides a confidence level of 99.9%.

An analyst in the environmental laboratory may examine the quality control database at any time. The analyst may check the percent recovery, duplicate ratios, percent of reference standard, and a blank value against the most recent mean, standard deviation, and control limits which have been calculated for each database. Thus, the analyst can assess whether the values found are within an acceptable range.

5.5. Daily record

On a daily basis, the QA/QC program manages data which monitor laboratory analyses of duplicate and spiked samples and synthetic knowns. The leader of the QA/QC group reviews the statistical programs which monitor these analyses daily. The leader checks the most recent database in the computer. Therefore, the leader can know whether the analytical method's performance is within acceptable ranges and can decide whether to accept, reject, or repeat the analyses.

Each day the QA/QC group leader is able to review a report containing information on the quality control samples. The sample number, test parameter, quality control sample type, date of analysis, percent recoveries, relative errors, and warning and control limits are shown on this report. The QA/QC group leader is thus able to examine these data each day and evaluate acceptability. A scan of the sheet can tell the status of unfinished samples and the values of quality control data entering databases.

6. Reporting requirements

The Annual Ground Water Compliance Monitoring Report will comprehensively address the technical requirements of 40 CFR 264 Subpart F and the Permit. The report will be submitted to MDNR by March 1 of each calendar year for the preceding calendar year. The report will discuss the evolution of the ground water monitoring program and an evaluation of the adequacy of the program related to its intended purpose. The report will summarize relevant ground water monitoring information in the form of discussions, ground water flow calculations, and diagrammatic illustrations. The report will include, but not be limited to:

- Field parameter measurements
- Copies of field sampling logs
- Ground water analytical reports
- Well repair documentation, if applicable
- QA/QC documentation
- Other relevant ground water information
- Tabulated ground water elevation data
- Comparison of analytical data to Permit Ground Water Protection Standards
- Ground water potentiometric maps
- Chemical concentration trend graphs
- Evaluation of the rate and direction of ground water flow
- Evaluation of the horizontal and vertical extent of hazardous constituents
- Evaluation of surface and subsurface well integrity
- Quantity of ground water purged from each well and total purged
- Boring logs for new borings
- Ground water monitoring well diagrams for new ground water monitoring wells.

7. Flood contingency

A contingency plan for the inspection of wells contacted by flood waters should not be necessary since the site is not in a 100-yr flood plain.

APPENDIX C

SAMPLING & ANALYSIS PLAN WORKSHEET

GROUNDWATER SAMPLING AND ANALYSIS PLAN (SAP) WORKSHEET
Prepared by
MISSOURI DEPARTMENT OF NATURAL RESOURCES
HAZARDOUS WASTE PROGRAM
GROUNDWATER UNIT

Facility Name and Address: Inland Realty Company
2500 E. First Street
Maryville, MO

Date of SAP evaluation: 6/17/99
Person performing evaluation: Chris Kump
Date and source of SAP evaluated: 3/29/99
O'Brien and Gere Engineering Consultants

		Y/N/NA
1.	**Does the SAP specify that the following field data be measured and recorded (field logbook or sample sheets) during each sampling event:**	
a)	Water level (each sampling event)?	Y
b)	Total well depth (at least annually)?	Y
c)	Weather (temp, general atmospheric conditions)?	Y
d)	Physical condition of the well?	Y
e)	Sampling team members?	Y
f)	Well number, date and time of sampling?	Y
g)	Physical description of well area?	Y
h)	Instrument calibration information (before and after)?	Y
i)	Actual well purge volume and calculations?	Y
j)	Presence/thickness of any immiscible layers present?	NA
k)	Any deviation from planned sampling methodology?	--
2.	**For well purging does the SAP specify:**	
a)	Purging technique?	Y
b)	Type/composition of equipment (manufacture, model)?	Y
c)	Dedicated equipment?	Y
d)	Non-dedicated equipment? Depth Probe	Y
e)	Decontamination procedures for non-dedicated equipment? Distilled Water	Y
f)	Volume to purge (generic)?	Y
g)	Method of calculation of purge volume?	Y
h)	Use of stabilized field parameters (pH, temp, Sp. Cond., Eh) to determine when purging is complete?	Y

		Y/N/NA
i)	Method to prevent purge equipment contact with contaminated surfaces.	Y
j)	Manner of disposal of purged fluids? On-site wastewater pretreatment system.	Y

3. For well sampling does the SAP specify:

a)	Sampling technique (gentle bailer lowering, bottom discharge for volatiles, pump rates, etc.)?	Y
b)	Type/composition of equipment (manufacture, model)?	Y
c)	Dedicated equipment?	Y
d)	Non-dedicated equipment?	Y
e)	Decontamination procedures for non-dedicated equipment?	Y
f)	Dry well contingency plan for persistently dry wells?	Y
g)	Sampling protocol for low yield wells?	Y
h)	Sampling protocol of high yield wells?	Y
i)	Immiscible phase detection methods?	NA
j)	Immiscible phase sampling methods?	NA
k)	Pump and/or bailer intake level (generally)?	NA
l)	Pump rate (non-volatilization of sensitive parameters)?	NA
m)	Sampling order according to parameter volatilization potential?	NA

4. In relation to the monitored parameters does the SAP specify:

a)	Parameters required by regulation (detection)?	Y
b)	Waste-specific parameters (assessment)?	Y

5. In sampling for site-specific parameters does the SAP specify:

a)	Specific container/cap type for each parameter?	Y
b)	Volume of each type of sample container?	Y
c)	Parameter specific preservative method (chemical and/or cooling)?	Y
d)	Maximum parameter-specific holding time?	Y
e)	Sample container labeling requirements?	Y
f)	Method of packaging & shipment (coolers, blue ice, carrier, etc.)?	Y

6. In relation to field and laboratory QA/QC does the SAP specify:

a)	General QA/QC procedures?	Y
b)	The use and frequency of trip blanks (e.g., 1 trip blank per container type)?	Y
c)	Trip blank preparation protocol?	Y
d)	The use and frequency of equipment blanks where non-dedicated samplers are used (e.g., one per non-dedicated sampling	

		Y/N/NA
	equip type)?	NA
e)	Equipment blank preparation protocol?	NA
f)	The use and frequency of duplicate samples (e.g., 5-10% of total samples)?	Y
g)	The use and frequency of spiked samples as an indicator of analytical performance or cross-contamination?	Y
h)	Spike sample preparation protocol?	Y
i)	Replicate parameter sampling protocol (e.g., pH, Sp. Cond., TOX, TOC)?	Y
j)	Split/duplicate sampling protocol?	Y
k)	Calibration frequency for field and laboratory analytical equipment?	Y
j)	Verification & reporting of analytical data (% recoveries for spiked samples, analytical detection limits, raw analytical data and calculations, etc.)?	Y

7. In relation to contaminated equipment does the SAP discuss:

a)	Decontamination of field equipment other than that used for purging or sampling (e.g., analytical instrument probes, depth measuring devices, etc.)?	Y
b)	Decontamination of laboratory equipment (e.g., sample bottles, sample analysis equipment, contaminated sample shipment containers)?	Y
c)	Disposal of potentially contaminated sampling equipment and clothing (e.g., glassware, plasticware, sample coolers containing broken sample bottles, gloves, coveralls, etc.)?	Y

8. Does the SAP discuss sample Chain-of-Custody (COC) including:

a)	Field and laboratory COC procedures?	Y
b)	Disposition of samples?	Y
c)	COC sample forms?	Y

9. Does the SAP include a Health and Safety Plan (HSP) that discusses:

a)	Required level of personal protection?	Y
b)	Required or recommended personal protective/monitoring equipment?	Y
c)	Use of a photo-ionization detector or HNU meter to check the wellbore headspace prior to sampling in wells known or suspected of being contaminated with volatile organics?	NA
d)	Special sample handling requirements?	Y
e)	Periodic medical monitoring for site personnel?	Y
f)	A field emergency contingency plan?	Y
g)	The telephone numbers and location of emergency facilities?	Y
h)	Field personnel training requirements/documentation?	Y
i)	Physical/chemical hazards discussion?	Y

Y/N/NA

10. Does the SAP specify routine well inspection and maintenance procedures including:

a) Inspection and documentation of all visible components of each monitoring well (See O&M Worksheet 3 of 3) during each groundwater elevation measurement/sampling event? Y__

b) A copy of the well inspection worksheet used to document the above inspections? Y__

c) Contingencies for well repair/replacement within a reasonable time frame should the well integrity inspection reveal damage? Y__

d) A contingency for inspection of wells contacted by flood waters as soon as such waters recede enough to perform such inspection? Y__

e) Measurement of total depth to ±0.1' in each well at least annually? Y__

f) Comparison of total versus as-built depths for each well at least annually to assess the degree of well screen occlusion? Y__

g) A well redevelopment trigger criterion (e.g., 5-10% of screen) as based on the degree of well screen occlusion/contaminants of concern including a general time frame for such redevelopment? Y__

h) Other procedures for periodically assessing subsurface casing integrity (e.g., gauge ring, caliper logs, downwell video logging) including provisions for repair/replacement of wells if indicated? Y__

APPENDIX D

MEASUREMENT, PURGING, & WELL INTEGRITY WORKSHEET

FILE: Inland Realty
Nodaway County

STATE OF MISSOURI

Bob Holden, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF GEOLOGY AND LAND SURVEY

P.O. Box 250 111 Fairgrounds Rd. Rolla, MO 65402-0250

(573) 368-2100

FAX (573) 368-2111

STATE OF MISSOURI
KURT R. HOLLMAN
RG0631
REGISTERED GEOLOGIST

MEMORANDUM

DATE: January 29, 2002

TO: Christine Kump, Engineer
Groundwater Unit, Hazardous Waste Management Program, ALPD

FROM: Kurt Hollman, Geologist
Environmental Geology Section, Geological Survey Program, DGLS

RECEIVED
FEB 0 4 2002
HAZARDOUS WASTE PROGRAM
MO DEPT. OF NATURAL RESOURCES

SUBJECT: Inland Realty O & M Inspection

LOCATION: Nodaway County, Missouri
SE, SW, Sec. 16, T. 64N R. 35W
Latitude: 40° 20' 46" N. Longitude: 94° 50' 44' W.

On December 2, 2002, an inspection of the monitoring well network and water level measuring procedure was performed at the Inland Realty (formerly Nixdorf-Lloyd) site in Maryville, Missouri. Seventeen monitoring wells and piezometers were inspected for physical integrity with regard to surface well seals, inner and outer casings and general well condition. Purging and sampling took place the same day with representatives from ESP being present.

Overall, the monitoring well network appears in sound condition. However, several minor deficiencies were discovered at the site. Four of the outer protective casings were rusty but still intact. A painting of the wells will forestall further corrosion and extend the life of the well. Only one well of the nine inspected had adequate collision protection. Some wells and piezometers located around the former lagoon may be vulnerable to heavy mowing equipment, if such heavy equipment is used at the site.

Two of the surface well seals are cracked at MW-9 and P-1.The surface well seal at P-3 has a cracked edge. Another seal was lifted at P-2.

The physical deficiencies noted above may not be significant enough to start repair and restoration since the site is approaching the last phase of monitoring before final closure.

The static water level and total depth measurements were audited in five of the regularly sampled wells. On average, the GSP measured water levels less than 0.01 feet shallower than the consultants for Inland Realty (O'Brien and Gere). On average the GSP measured total well depth 0.03 feet deeper than the consultants for Inland Realty. The small discrepancies in measurements are likely due to a difference in equipment

calibration and / or measurement technique. The small difference in measurement values collected convince me that accurate water levels are being measured during regularly scheduled sampling periods.

KH:

Attachments

MEASUREMENT, PURGING AND WELL INTEGRITY WORKSHEET (3 OF 3)
Prepared by MDNR Division of Geology and Land Survey

Facility Name and Address: **Inland Realty**
(a.k.a. Laclede Chain, Nixdorff-Lloyd)
2500 E. First Street
Maryville, MO 64468

Date of Inspection: December 02, 2001

Participants:

Name	Position	Representing
Kurt Hollman	Geologist	MDNR/GSRAD
Bill Wright	Hydrogeologist	O'Brien & Gere Engineers, Inc.
Larrry Lehman	Environmental Specialist	MDNR/ESP

I. Review of Measurement and Purging Procedures

1. Prior to Well Purging

Y/N/NA

a) Are the well numbers clearly marked on the well? YES
If yes, how and where: Black Marker
b) Were measures taken to prevent evacuation/sampling equipment from contacting potentially contaminated surfaces? YES
If yes, what measures: Plastic Sheeting laid across well pad.
c) Were static water levels measured? YES
d) Were depths to bottom of the wells measured? YES
e) Are measurements taken to the nearest 0.01 feet? YES
f) Is there a permanent depth measurement reference point at each well? YES
If yes, where is this point located: Notch or marker at top of riser.
g) Description of depth measuring device used (type, manufacturer, model):
Slope#51453, Fiberglass measuring tape – weighted for TDs.
h) Was depth measuring device cleaned and dried after each measurement? YES
i) If yes, describe procedure..DI Water rinse and paper towel dry.
i) Record any well audit measurements made below:

DGLS			Facility	
Well #	**Depth to Water**	**Depth to Well Btm**	**Depth to Water**	**Depth to Well Btm**
5S	8.92	23.80+.06=23.86	8.91	23.82
5D	11.56	37.71 +.06=37.77	11.56	37.76
MW-9	6.90	30.10+.06=30.16	6.91	30.17
4S	7.18	20.40.06=20.46	7.19	20.38
4D	8.55	37.04+.06=37.10	8.55	37.09

2. Detection and Sampling of Immiscible Layers **Y/N/NA**

a) Are procedures used which will detect light phase immiscible layers? NO
If yes, describe:
b) Are procedures used which will detect dense phase immiscible layers? NO
If yes, describe: _
c) Are any detected immiscible layers sampled separately prior to well evacuation? If yes, describe procedure: _____ NO
d) Do both procedures used minimize mixing with the aqueous phase? N/A

3. Well Evacuation

a) Are low yielding wells evacuated to dryness? YES
b) Are high yielding wells evacuated until the well purging parameters of pH, temperature and specific conductance have stabilized to ±10% over two successive well purge volumes? YES
c) If no to b, are at least three well casing volumes purged from high yielding wells? YES
d) Describe field method used to calculate the volume of evacuated fluid:
Height water column X 0.163 (2" Well) = 1 well volume.
Describe field method used to measure the volume of evacuated fluid:
Height water column X 0.653 (4" well) Three (3) volumes taken.
e) Describe field method used to measure the volume of evacuated fluid:
Five (5) gallon buckets are filled, volume estimated to ½ gallon.
f) Describe field procedure for collection, management and disposal of evacuated fluid: Twenty (20) gallon plastic trash can filed on truck, water sent to on site treatment at Laclede Chain.
g) If evacuated fluids are disposed of on the ground, how far from the wellbore are such fluids disposed :N/A
h) Does each well have dedicated evacuation equipment? YES
i) Describe well evacuation equipment (type, composition, manufacturer, model, etc.) including delivery lines used to lower equipment into the well: Four (4) foot PVC bailers, 5/32" polypropylene delivery line.
j) Describe the decontamination procedure used for non-dedicated evacuation equipment: Lines are disposed in trash, no other non-dedicated equipment except for water
k) Describe the physical properties of the evacuated water:

Well No.	4S	5S	9					
Color	Lt. Tan	Clear	Gray					
Odor	No	No	No					
Oil/grease	No	No	No					
Turbidity	Moderate	No	Heavy					

II. Visual Well Integrity Inspection

1. For all wells inspected, describe the material type (e.g., concrete, soils, etc.) and condition (e.g., intact, cracked, broken, lifted, pulled-away, etc.) of the surface well seal (i.e., the material surrounding the well casing at the ground surface). Also describe the material type (e.g., PVC, steel) and condition (e.g., intact, cracked, broken, bent, lifed, etc.) of both the outer protective well casing and inner casing riser.

	Surface Well Seal		Outer Well Casing		Inner Well Casing	
Well #	Type	Condition	Type	Condition	Type	Condition
MW-9	Concrete	Cracked	Steel	Rusted	PVC	Intact
MW-4D	Concrete	Intact	Steel	Intact	PVC	Intact
MW-4S	Concrete	Intact	Steel	Intact	PVC	Intact
MW-7	Concrete	Intact	Steel	Rusted	PVC	Intact
MW-3D	Concrete	Intact	Steel	Intact	PVC	Intact
MW-3S	Concrete	Intact	Steel	Intact	PVC	Intact
MW-2S	Concrete	Intact	Steel	Intact	PVC	Intact
MW-2D	Concrete	Intact	Steel	Intact	PVC	Intact
P-1	Concrete	Cracked	N/A	N/A	PVC	Intact
P-2	Concrete	Lifted	N/A	N/A	PVC	Intact
P-3	Concrete	Cracked Edge	N/A	N/A	PVC	Intact
P-4	Concrete	Intact	N/A	Intact	PVC	Intact
MW-3	Concrete	Intact	Steel	Intact	PVC	Intact
MW-6S	Concrete	Intact	Steel	Rusted	NI	NI
MW-6D	Concrete	Intact	Steel	Rusted	NI	NI
5S	Concrete	Intact	Steel	Intact	PVC	Intact
5D	Concrete	Intact	Steel	Intact	PVC	Intact

2. For all wells inspected, describe the physical properties of the surface well seal (i.e., approximate diameter (inches/feet), % coverage surrounding well casing, sloped away from wellbore to promote drainage (yes/no), water ponding (yes/no) or surface run-off flow (yes/no), evident around or near wellbore).

Surface Wells Seals					
Well #	**Diameter**	**% Coverage**	**Sloped?**	**Ponding?**	**Run-off?**
MW-9	Lot	100	Yes	No	Yes
MW-4D	4 X 4	100	No	No	Yes
MW-4S	4 X 4	100	No	No	Yes
MW-7	4 X 4	100	No	No	Yes
MW-3D	4 X 4	100	No	No	Yes
MW-3S	4 X 4	100	No	No	Yes
MW-2S	4 X 4	100	No	No	Yes
MW-2D	4 X 4	100	No	No	Yes
P-1	2'	100	Yes	No	Yes
P-2	2'	100	Yes	No	No
P-3	2'	100	Yes	No	No
P-4	2'	100	No	No	Yes
MW-3	4 x 4	100	No	No	Yes
MW-6S	4 x 8	100	No	No	Yes
MW-6D	4 X 8	100	No	No	Yes
5S	4 X 4	100	No	No	Yes
5D	4 X 4	100	No	No	Yes

3. For all wells inspected, detail the following items related to the surface protective casing and well casing riser: 1) Protective casing cap type (e.g., screw-type, hinged), composition (e.g., PVC, steel), security configuration (i.e., locking, non-locking) and condition (i.e., intact, cracked); 2) Is there a drainage hole in the protector casing? (yes/no); Is it open? (yes/no); How far above ground level is the hole? (inches/feet); 3) Are protective posts installed around the well? (yes/no).

Accessory Well Information								
	Casing Cap				Drainage Hole			
Well #	Type	Composit	Configur.	Condition	Hole?	Open?	Height	Posts?
MW-9	Hinged	Steel	Locking	Intact	No	N/A	N/A	Yes
MW-4D	Hinged	Steel	Locking	Intact	Yes	Yes	2"	No
MW-4S	Hinged	Steel	Locking	Intact	Yes	Yes	1"	No
MW-7	Hinged	Steel	Locking	Intact	No	No	N/A	No
MW-3D	Hinged	Steel	Locking	Intact	Yes	Yes	1"	No
MW-3S	Hinged	Steel	Locking	Intact	Yes	Yes	1"	No
MW-2S	Hinged	Steel	Locking	Intact	Yes	Yes	1"	No
MW-2D	Hinged	Steel	Locking	Intact	Yes	Yes	2"	No
P-1	Slip	PVC	Non-locking	Intact	N/A	N/A	N/A	No
P-2	Slip	PVC	Non-locking	Intact	N/A	N/A	N/A	No
P-3	Slip	PVC	Non-locking	Intact	N/A	N/A	N/A	No
P-4	Slip	PVC	Non-locking	Intact	N/A	N/A	N/A	No
MW-3	Hinged	Steel	Locking	Intact	Yes	Yes	1'	No
MW-6S	Hinged	Steel	Locking	Intact	Yes	Yes	1"	No
MW-6D	Hinged	Steel	Locking	Intact	Yes	Yes	1"	No
5S	Hinged	Steel	Locking	Intact	Yes	Yes	4"	No
5D	Hinged	Steel	Locking	Intact	Yes	Yes	4"	No

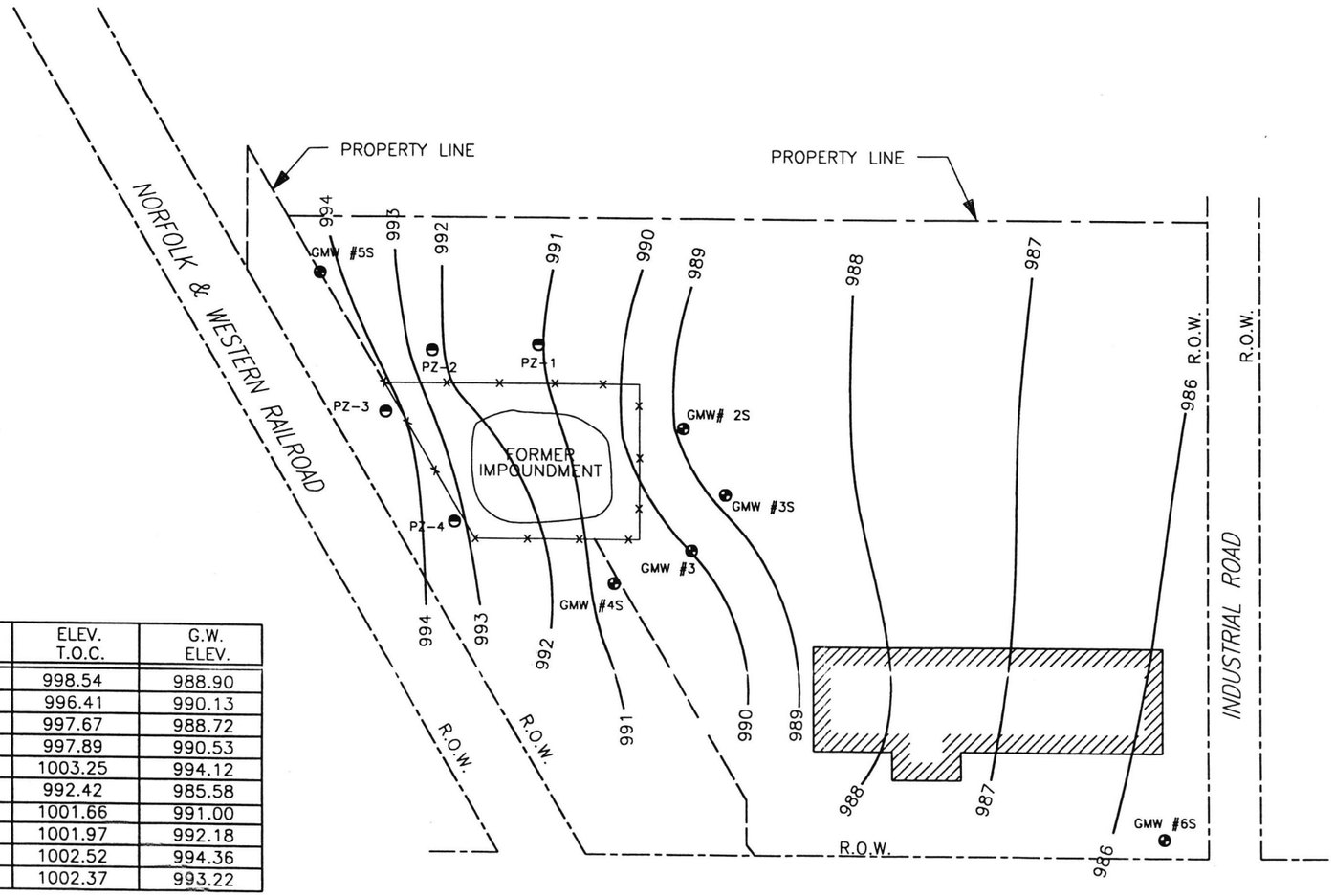
GSRAD MEASUREMENT DIFFERENCES		
WELL NUMBER	DEPTH TO WATER	TOTAL DEPTH
5S	+0.01	+0.04
5D	0.00	+0.01
MW-9	-0.01	-0.01
4S	-0.01	+0.08
4D	0.00	+0.01
SUM	-0.01	+0.13

Average Difference $\frac{-0.01}{5} = -0.002$ $\frac{+0.13}{5} = +0.026$

APPENDIX E

POTENTIOMETRIC MAPS

FIGURE 7



WELL NO.	DEPTH TO G.W.	ELEV. T.O.C.	G.W. ELEV.
2S	9.64	998.54	988.90
3	6.02	996.41	990.13
3S	8.95	997.67	988.72
4S	7.36	997.89	990.53
5S	9.13	1003.25	994.12
6S	6.84	992.42	985.58
P1	10.66	1001.66	991.00
P2	9.79	1001.97	992.18
P3	8.16	1002.52	994.36
P4	9.15	1002.37	993.22

LEGEND

- 990 — INFERRED GROUND WATER ELEVATION CONTOUR LINE
- GROUND WATER MONITORING WELL
- PIEZOMETER

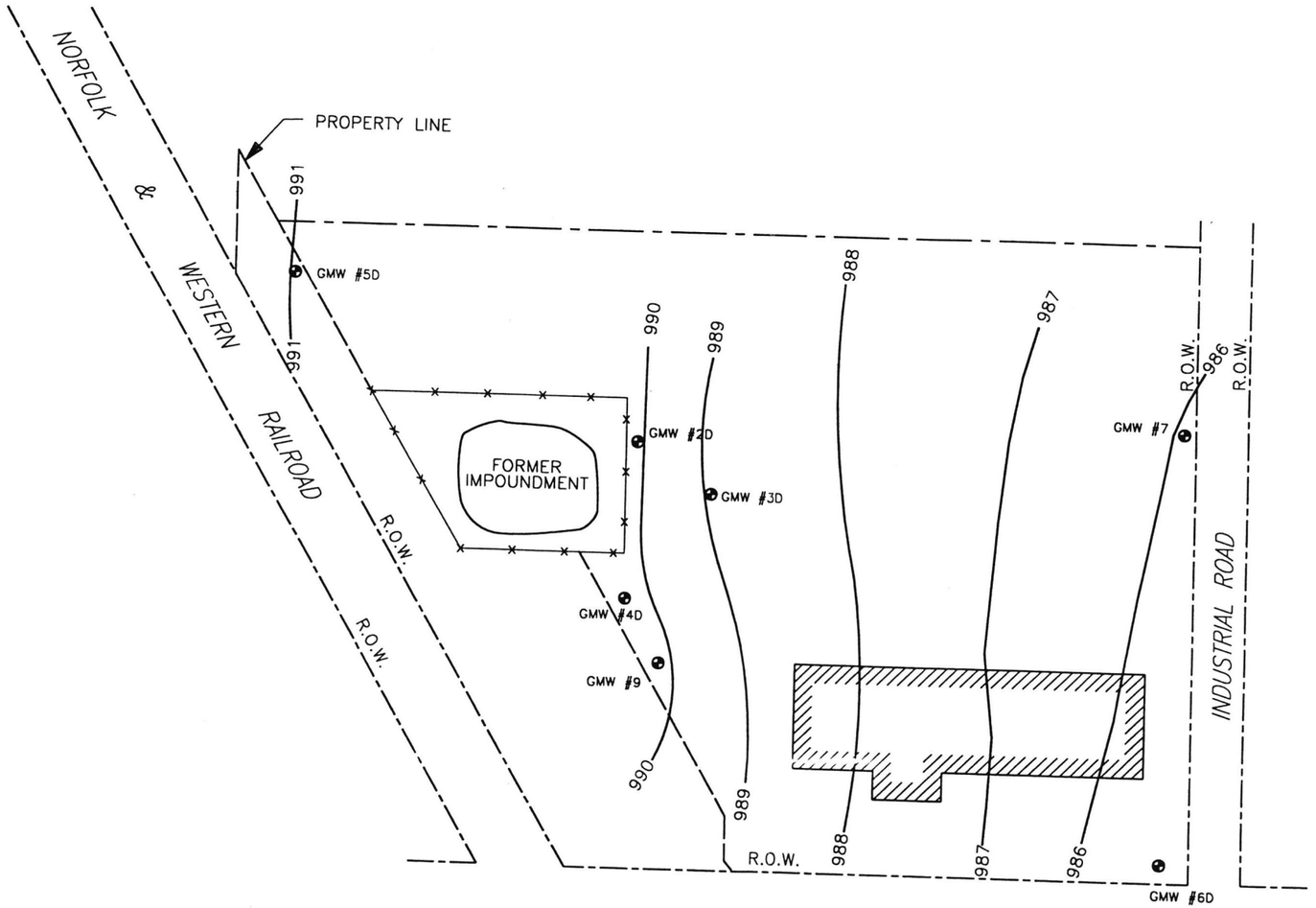
INLAND REALTY COMPANY
MARYVILLE, MISSOURI
SECOND QUARTER 2000
SHALLOW WELLS

GROUND WATER ELEVATION CONTOUR MAP

3050.005-202
JANUARY 2001

O'BRIEN & GERE ENGINEERS INC.

FIGURE 8



LEGEND

990 — INFERRED GROUND WATER ELEVATION CONTOUR LINE

● GROUND WATER MONITORING WELL

WELL NO.	DEPTH TO G.W.	ELEV. T.O.C.	G.W. ELEV.
2D	8.32	998.42	990.10
3D	8.72	997.71	988.99
4D	8.79	999.25	990.46
5D	12.25	1003.25	991.00
6D	6.91	992.47	985.56
7	8.44	994.42	985.98
9	7.15	997.34	990.19

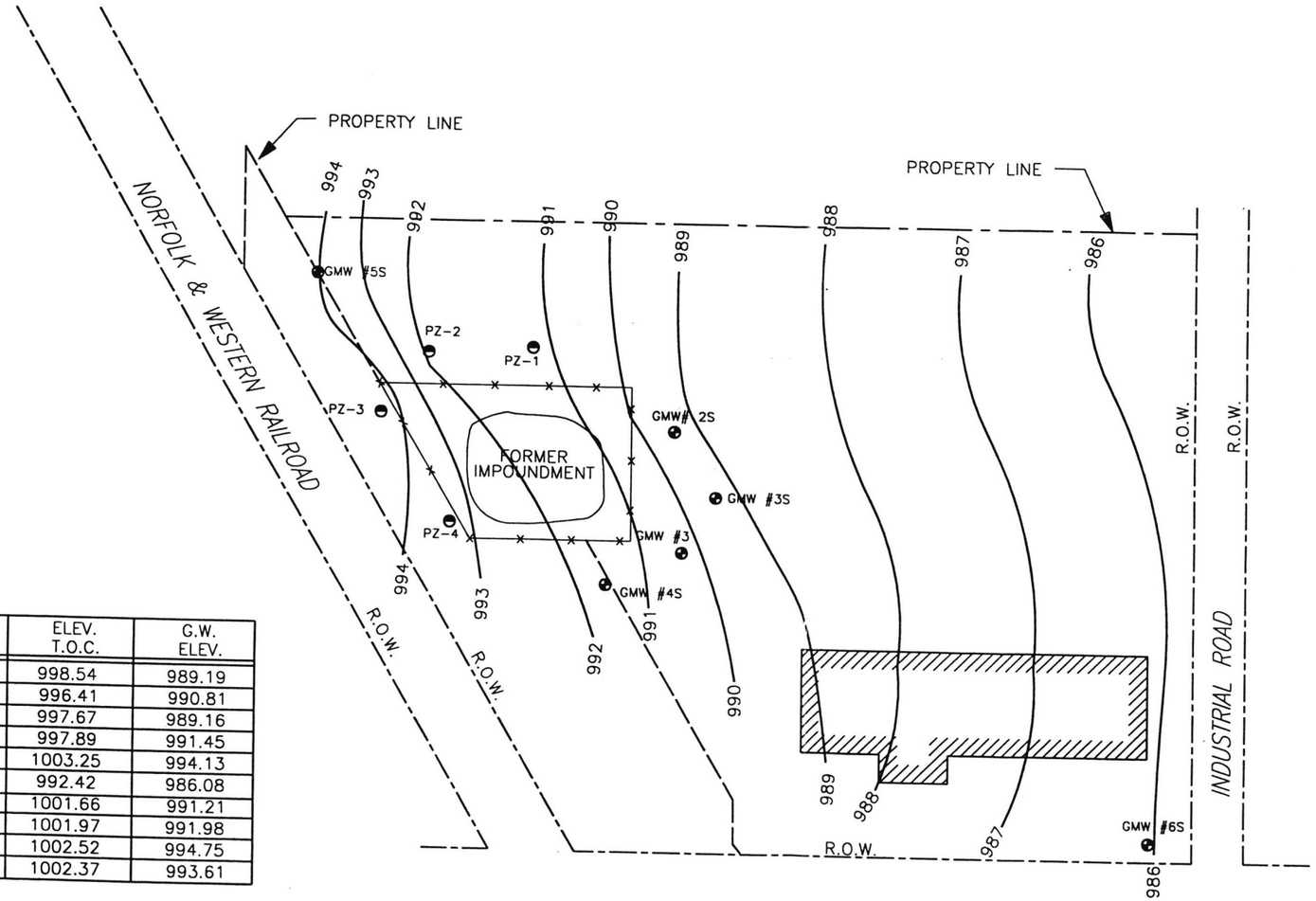
INLAND REALTY COMPANY
MARYVILLE, MISSOURI
SECOND QUARTER 2000
DEEP WELLS

GROUND WATER ELEVATION CONTOUR MAP

3050.005-203
JANUARY 2001

O'BRIEN & GERE
ENGINEERS INC.

FIGURE 9



WELL NO.	DEPTH TO G.W.	ELEV. T.O.C.	G.W. ELEV.
2S	9.35	998.54	989.19
3	5.60	996.41	990.81
3S	8.51	997.67	989.16
4S	6.44	997.89	991.45
5S	9.12	1003.25	994.13
6S	6.34	992.42	986.08
P1	10.45	1001.66	991.21
P2	9.99	1001.97	991.98
P3	7.77	1002.52	994.75
P4	8.76	1002.37	993.61

LEGEND

990 — INFERRED GROUND WATER ELEVATION CONTOUR LINE

GROUND WATER MONITORING WELL

PIEZOMETER

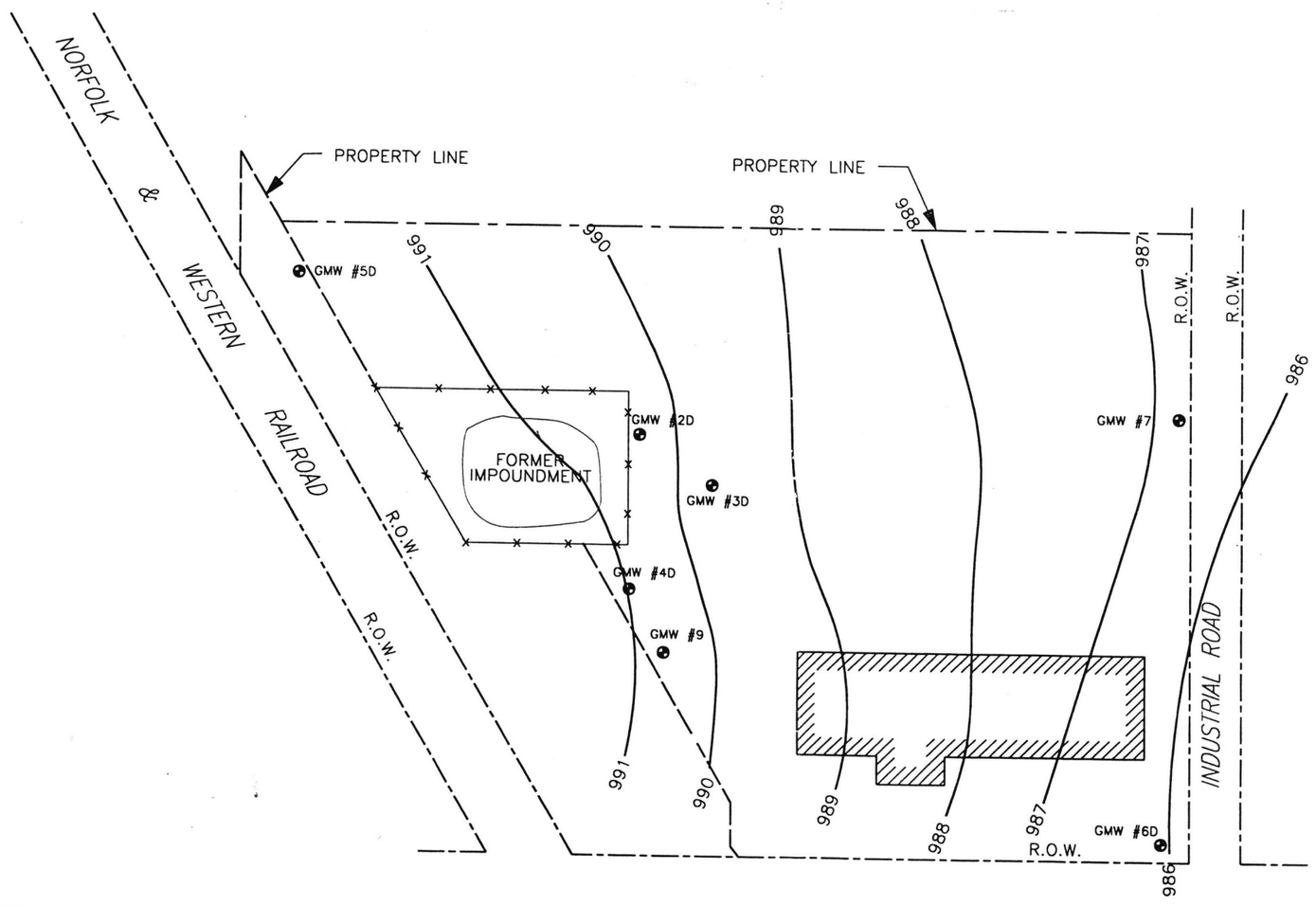
INLAND REALTY COMPANY
MARYVILLE, MISSOURI
FOURTH QUARTER 2000
SHALLOW WELLS

GROUND WATER ELEVATION CONTOUR MAP

3050.005-206
JANUARY 2001

O'BRIEN & GERE
ENGINEERS INC.

FIGURE 10



WELL NO.	DEPTH TO G.W.	ELEV. T.O.C.	G.W. ELEV.
2D	7.82	998.42	990.60
3D	8.28	997.71	989.43
4D	8.26	999.25	990.99
5D	11.45	1003.25	991.80
6D	6.39	992.47	986.08
7	7.56	994.42	986.86
9	6.60	997.34	990.74

LEGEND

990 — INFERRED GROUND WATER ELEVATION CONTOUR LINE

GROUND WATER MONITORING WELL

INLAND REALTY COMPANY
MARYVILLE, MISSOURI
FOURTH QUARTER 2000
DEEP WELLS

GROUND WATER ELEVATION CONTOUR MAP

3050.005-207
JANUARY 2001

O'BRIEN & GERE ENGINEERS INC.

DWG PATH: I:\DIV15\PROJECTS\3050005\DWG\207.DWG 1=1

PLOT DATE: 1/16/01 DIV15 JMA

APPENDIX F

GROUNDWATER MONITORING FIELD AUDIT REPORT

RCRA OPERATION & MAINTENANCE (O & M) GROUNDWATER MONITORING FIELD AUDIT REPORT

Inland Realty Enterprises, L.L.C.
Maryville, MO

December 4, 2001

Prepared For:

Missouri Department of Natural Resources
Air and Land Protection Division
Hazardous Waste Program

Prepared By:

Missouri Department of Natural Resources
Air and Land Protection Division
Environmental Services Program

Table of Contents

1.0 Introduction

The Missouri Department of Natural Resources (MDNR), Hazardous Waste Program (HWP) requested the MDNR, Environmental Services Program (ESP) to conduct a groundwater monitoring field audit at Inland Realty Enterprises, L.L.C. (hereafter Inland Realty) located in Maryville, Missouri. The field audit was conducted on December 4, 2001, as part of the MDNR's agreement with the U.S. Environmental Protection Agency (EPA) to conduct Groundwater Compliance Monitoring Program inspections at Resource Conservation and Recovery Act (RCRA) regulated facilities.

The equipment and methods used by the facility sampling team for the collection of groundwater samples were observed and critiqued by Larry Lehman, Environmental Specialist with the ESP. Furthermore, the ESP collected split groundwater samples for independent analyses by the state. Bill Wright, Hydrogeologist, O'Brien & Gere Engineers, Inc., was present to conduct the sampling for the facility.

Samples collected by the facility were sent to Severn Trent Laboratories, Earth City, Missouri, for analyses. Kurt Hollman, Geologist with the MDNR's Geological Survey and Resource Assessment Division was on-site to evaluate monitoring well conditions, record well depth measurements, photograph each monitoring well, and observe well evacuation procedures.

2.0 Site Description and History

2.1 Site Location

The site is located at 2500 East First Street on the east side of Maryville, Missouri. The legal description is the SE ¼ sec. 16, T. 64 N., R. 35 W., as found on the Maryville East, MO Quadrangle 7.5 Minute Topographic map.

2.2 Site Description

The site consists of a manufacturing facility operated by the Laclede Chain Manufacturing Company. A flat field and former surface impoundment is located north of the office/manufacturing complex. The site lies within the 100-year floodplain of the One Hundred and Two River, which flows east of the site.

2.3 Site History/Contaminants of Concern

The Inland Realty site, previously Nixdorff-Lloyd Chain Company, historically manufactured low carbon steel tire chains from 1970 until 1984, when the facility was leased to Laclede Chain Manufacturing. Inland Realty utilized an unlined surface impoundment to treat process wastes from facility plating and pickling operations. Typical waste streams to the impoundment included both RCRA characteristic and listed wastes (sulfuric acid, chromium, lead, cadmium, nickel, zinc, and cyanide). Inland Realty ceased treating hazardous wastes in the impoundment

in 1981. Groundwater monitoring at the impoundment began in 1982 and formal closure of the impoundment occurred in 1989.

Inland Realty switched from a groundwater assessment monitoring program to a detection monitoring program in 1989, then reverted back to assessment monitoring in late 1989 following confirmed hazardous waste contamination in the shallow groundwater downgradient from the impoundment. The main hazardous constituents of the contaminant plume include nickel, chromium, cyanide, and lead. In addition, elevated levels of zinc, sulfates, and manganese along with a low pH have been discovered in the shallow groundwater.

3.0 Methods

3.1 Field Procedures

The procedures used by the facility sampling personnel for the collection of groundwater samples were documented in a worksheet that is attached to this report as Appendix A. The field procedures are summarized below. The field audit conducted by the ESP included the collection of split groundwater samples for independent analyses at the State Environmental Laboratory within the ESP. The ESP field person collected split samples from monitoring wells GMW#4D, GMW#4S, GMW#5S, and GMW#9. Each well had a dedicated PVC bailer, suspended inside the well when not in use, which was used to evacuate the stagnant water.

The facility sampling personnel followed the well evacuation procedures as outlined in the facility's "Ground Water Sampling and Analysis Plan" dated March 1999. Static water levels were measured and used to calculate well volumes. One monitoring well was bailed dry after one well volume (GMW#4S). The well was allowed sufficient time to recover before sampling.

In wells with sufficient recharge, pH, specific conductance, and temperature measurements were taken after each well total volume was evacuated. Purging continued until two water quality parameters (pH, specific conductance, and temperature) were within plus/minus 10% of the preceding value over two successive well volumes. Facility sampling personnel also assured that at least three total well volumes were removed. Three total well volumes were removed from monitoring wells GMW#4D and GMW#5S. Four total well volumes were removed from monitoring well GMW#9.

The amount of water purged was measured by pouring it into a 5-gallon graduated bucket. The evacuated water was disposed into the facility's water treatment system.

Each well was sampled using the same dedicated bailer that had been used for well evacuation. The facility collected samples for the analyses of cyanide and total metals (cadmium, lead, mercury, chromium, nickel, manganese, and zinc). The ESP field person collected split samples for the analysis of total RCRA metals (silver, arsenic, barium, cadmium, chromium, mercury, lead, and selenium).

The groundwater split samples collected by the ESP field person are summarized in the table below.

SAMPLE NUMBER	SAMPLE LOCATION	ANALYSES REQUESTED	PRESERVATIVE
0110943	Monitoring Well GMW#4D	RCRA Metals	HNO_3 & ice
0110944	Monitoring Well GMW#4S	RCRA Metals	HNO_3 & ice
0110945	Monitoring Well GMW#5S	RCRA Metals	HNO_3 & ice
0110946	Monitoring Well GMW#5S (Duplicate)	RCRA Metals	HNO_3 & ice
0110947	Monitoring Well GMW#9	RCRA Metals	HNO_3 & ice

3.2 Chain-of-Custody

All samples received a numbered label and were placed on ice in a cooler. The corresponding label number was entered onto a chain-of-custody form indicating the location, date and time of collection, and parameters to be analyzed. Custody of the samples was maintained by the ESP field person until relinquishing them to a sample custodian with the ESP in Jefferson City for analyses.

3.3 Analysis Requested

The state's samples were submitted for the analysis of total RCRA metals.

3.4 Quality Assurance/Quality Control (QA/QC)

All samples were analyzed in accordance with the general requirements and standard operating procedures of the Fiscal Year 2002 Generator/TSD Quality Assurance Project Plan.

Sample 0110946 was collected as a duplicate to sample 0110945 from monitoring well GMW#5S.

4.0 Investigation Derived Wastes

All of the personal protective equipment and spent disposable sampling equipment generated by the ESP were containerized and properly disposed of at the State Environmental Laboratory in Jefferson City.

5.0 Observations

The weather on December 4, 2001, was overcast and the high temperature was approximately 60 degrees Fahrenheit. The ESP field person arrived at the site at 0900 hours and departed the site at 1545 hours.

A duplicate sample was not collected by the facility during the sampling investigation. The "Ground Water Sampling and Analysis Plan" dated March 1999 states that a "A field duplicate sample shall be collected in the field by filling a second set of each type of sampling container with ground water from a ground water monitoring well labeled with the groundwater monitoring well number from which the sample was collected, followed by the letter "A"". The facility sampling personnel should ensure duplicate samples are collected during all sampling investigations.

The sampling equipment and methods used by the facility sampling personnel were observed in the field and critiqued by the ESP (Appendix A).

6.0 Data Reporting

Please refer to Appendix B for analytical results of samples collected.

Submitted by: Larry Lehman

Larry Lehman
Environmental Specialist
Superfund/RCRA Unit
Environmental Services Program

Date: Jan. 8, 2002

Approved by: Earl Pabst

Earl Pabst
Director
Environmental Services Program

EP:llt

c: - Christine Kump, HWP -

APPENDIX A

Sampling and Analysis Procedures Worksheet

Inland Realty Enterprises, L.L.C.
Maryville, Missouri
December 4, 2001

RCRA Operation and Maintenance (O & M) Field Audit

Sampling and Analysis Procedures Worksheet
Prepared by the MDNR Environmental Services Program

Facility Name and Address: Inland Realty Enterprises, L.L.C.
2500 East First Street
Maryville, MO 64468

Date(s) of Sampling: December 4, 2001

Lab Name and Address: Severn Trent Labortories
13715 Rider Trail North
Earth City, MO 63045

Participants:

Name	Position	Representing
Larry Lehman	Environmental Specialist	MDNR-ALPD-ESP
K[illegible]llman	Geologist	MDNR-GSRAD
W[illegible]n Wright, R.G.	Hydrogeologist	O'Brien & Gere Engineers, Inc.

I. Review of Sampling and Analysis Procedures Y/N/NA

1. Prior to Well Evacuation (ESP use only if DGLS has not evaluated):

   a. Are the well numbers clearly marked on the well? _____
   If yes, how are they marked and where? DGLS evaluated all of the items in section 1.

   b. Were measures taken to prevent evacuation/sampling equipment from contacting potentially contaminated surfaces? _____
   If yes, what measures? _____

   c. Were static water levels measured? _____

   d. Were total well depths measured? _____

e. Are measurements taken to the nearest 0.01 feet? _____

f. Is there a permanent depth measurement reference point at each well? _____
If yes, where is this point located? _____

g. Description of depth measuring device used (type, manufacturer, model):

h. Was depth measuring device cleaned and dried after each measurement? _____
If yes, describe decontamination procedure: _____

2. Detection/Sampling of Immiscible Layers (ESP use only if DGLS has not evaluated):

a. Are procedures used which will detect light phase immiscible layers? _____
If yes, describe: DGLS evaluated all of the items in section 2.

b. Are procedures used which will detect dense phase immiscible layers? _____
If yes, describe: _____

c. Are any detected immiscible layers sampled separately prior to well evacuation? _____
If yes, describe the procedure: _____

d. Do the procedures used minimize mixing with the aqueous phase? _____

3. Well Evacuation (ESP use only if DGLS has not evaluated):

a. Are low yielding wells evacuated to dryness? _____
DGLS evaluated all of the items in section 3.

b. Are high yielding wells evacuated until the parameters of pH, temperature, and specific conductance have stabilized to ± 10% over two successive well purge volumes? _____

c. If no to b, are at least three well casing volumes purged from high yielding wells? _____

d. Describe field method used to calculate the volume of evacuated water:

e. Describe field method used to measure the volume of evacuated water:

f. Describe procedure used for collection, management, and disposal of evacuated water:

g. Does each well have dedicated evacuation equipment? _____

h. Describe well evacuation equipment (type, composition, manufacturer, model, etc.) including delivery lines use to lower equipment into well:

i. Describe the decontamination procedure used for non-dedicated evacuation equipment:

j. Describe the physical properties of the evacuated water:

Well Number				
Color				
Odor				
Oil/Grease				
Turbidity				

4. Sample Withdrawal:

a. In what sequence were the wells sampled? The wells were sampled in the following order, from first to last: GMW#4D, GMW#4S, GMW#5S, and GMW#9.

b. Were wellbore fluid levels checked in low yield wells prior to sample collection to determine if sufficient fluid was available to sample for the parameters of concern? Yes

c. Were low yield wells sampled as soon as sufficient wellbore fluid volume was available? Yes

d. For low yield wells, on average how much time elapsed between well purging and sampling? Monitoring well GMW#4S was allowed to recharge for approximately 3 hours prior to sampling.

e. Were wellbore fluid levels checked in high yield wells prior to sample collection to determine the percent recovery of wellbore fluids? No

f. According to the facility's sampling personnel, approximately what percent fluid recovery is deemed adequate prior to sampling high yield wells? _____
The facility sampling personnel don't have an established percent fluid recovery figure that is used in their sampling protocol.

g. Were high yield wells allowed to achieve this percent recovery prior to sample collection? As previously discussed, the facility did not have an established percent recovery figure.

h. For high yield wells, on average how much time elapsed between well purging and sampling? The high yield well was sampled immediately after purging.

i. Describe well sampling equipment (type, composition, manufacturer, model, etc.) including delivery lines used to lower equipment into the well:
A dedicated PVC bailer suspended in each well was used in conjunction with 5/32-inch polypropylene delivery line.

j. Does each well have a dedicated sampling device? Yes

k. If no to j, is non-dedicated equipment decontaminated between wells? NA

l. Describe the decontamination procedure used for non-dedicated sampling equipment: All of the sampling equipment used by the facility was dedicated.

m. Is non-dedicated sampling equipment thoroughly dried before each use? NA

n. For non-dedicated sampling equipment, were equipment blanks collected to Monitor for potential sample cross-contamination? NA

o. If yes to n, how frequently were equipment blanks collected? NA

p. Describe the procedure used to collect equipment blanks: NA

q. Were duplicate samples collected? No

r. If yes to q, how frequently are duplicate samples collected? NA

s. Describe the duplicate sampling procedures: NA

t. Was care taken to avoid placing clean sampling equipment on the ground or other potentially contaminated surfaces prior to use? Yes

u. If bailers were used, were they lowered and raised slowly enough to prevent sample degassing or volatilization of sensitive parameters? Yes

v. If volatile organics were sampled with a pump, was the sample collection pump rate at or below 100 ml/minute? NA

w. If no to v, what was the sample collection pump rate? NA

x. Were samples transferred directly from the sampling device to the sample containers? Yes

y. Describe the sample transfer procedure: The groundwater was transferred into the sample containers by pouring the groundwater from the top of the bailer.

z. Describe the method used to obtain split samples: The MDNR's sample container was filled after the facility filled their sample container for the analysis of metals.

aa. Overall, were samples collected in a manner which would minimize changes in the sample due to adsorption, aeration, agitation, volatilization, etc.? Yes

bb. If no to aa, describe any potential problems observed: NA

cc. Were samples collected and containerized in the order of site-specific parameter's volatilization sensitivity (e.g., in descending order – VOA, TOX, TOC, semi-volatiles, metals and cyanide, major water quality cations and anions, radionuclides)? Yes

dd. Were samples collected for dissolved metals? No

ee. If yes to dd, were the samples field filtered using a 0.45 micron filter? NA

ff. If yes to dd, but no to ee, please explain: NA

gg. List any parameters measured in the field by the facility: The facility sampling personnel measured pH, temperature, specific conductance, and turbidity.

hh. Describe the equipment (type, manufacturer, model) used by the facility for taking field measurements:

pH	HyDAC Digital Tester
temperature	HyDAC Digital Tester
conductivity	HyDAC Digital Tester
turbidity	DRT-ISCE Turbidimeter
dissolved oxygen	NA

ii. List the values for any field measurements taken by the facility:

Well number	GMW#4D	GMW#4S	GMW#5S	GMW#9	
pH	5.78	5.78	6.36	5.94	
Temperature ° F	59.2	62.1	61.7	63.1	
Conductivity in µmhos	1553	2650	2820	1264	
Turbidity in ntus	11.7	28.4	36.4	60.0	

jj. Describe all field equipment calibration and maintenance procedures:
Mr. Wright used a two-point calibration for the pH meter (4 and 7 buffer standard solutions). The conductivity meter was compared to a certified standard solution 1,413 umhos. The turbidity meter was compared to a certified standard solution .02 ntu.

kk. Are the procedures under jj performed pursuant to the manufacturer's recommendations and consistent with accepted protocol (e.g., SW-846)? Yes

ll. Are a field logbook and/or individual well sampling sheets maintained? Yes
If yes, which one is used? Both are used.

Are the following items documented in either or both of the above:

Date and time of sampling? Yes
Weather conditions? Yes
Field sampling participants? Yes
Observations and physical well integrity? Yes
Field equipment descriptions? Yes
Field analysis results? Yes
Field equipment and calibration/maintenance information? Yes
Any other pertinent field observations or unusual conditions? Yes

mm. Who maintains the field log book/well sampling sheets? Mr. Wright maintains

the log book and sampling sheets.

nn. Describe the physical properties of the groundwater samples:

Well number	GMW#4D	GMW#4S	GMW#5S	GMW#9	
Color	Clear	Light Brown	Clear	Clear	
Oil/Grease	None	None	None	None	
Turbidity	Low	Low	Low	Low	
Odor	None	None	None	None	

5. Sample Preparation and Handling:

a. List the sample containers and preservation methods used by the facility for each parameter or group of parameters to be analyzed:

Parameter/Group	Sample Container	Preservation
Cyanide	250 ml plastic container	Sodium Hydroxide & ice
Total Metals	500 ml plastic container	Nitric acid & ice

b. Were the sample containers utilized for specific parameters consistent with current guidance (e.g., SW-846)? Yes

c. Were any of the sample containers pre-cleaned prior to use (i.e., solvent-rinsed, baked, etc.) The contract lab used by the facility for sample analyses provided the pre-preserved, certified-clean sample containers.

d. Were the samples preserved in accordance with current EPA-approved procedures? Yes

e. If any non-EPA preservation methods were used, list the source(s) from which these methods were derived: NA

f. Were sample containers pre-preserved or were preservatives added in the field? The contract lab sent the sample containers pre-preserved.

g. Were the sample containers labeled? Yes

h. Do the labels provide the following information:

Sample identification number? Yes
The well number was used as the sample identification number.
Well number? Yes
Name of collector? Yes

Date and time of collection? Yes
Facility name? Yes
Parameter analyses requested? Yes

i. Do the sample labels remain legible when wet? Yes

j. Is a chain-of-custody record included with each sample? Mr. Wright completed the chain-of-custody at the end of the day before the samples were processed for shipping.

k. Does the chain-of-custody record document the following:

Sample identification number? Yes
Well number? Yes
Signature of collector? Yes
Date and time of collection? Yes
Sample container and preservative type? Yes
Number of containers? Yes
Parameter analyses requested? Yes
Signature of all persons involved in the chain-of-possession? Yes
Inclusive dates of possession? Yes

l. Was the headspace completely eliminated from containers used to collect samples for volatile organic analysis? NA

m. Is at least one trip blank prepared for each sample container type to verify sample container cleanliness and field handling methods? No

n. If no to m, were any trip blanks prepared? NA

o. If yes to m, in what containers and how many? Mr. Wright did collect a field blank for each container type at the end of the sampling event.

p. What type of laboratory is used for the sample analysis (e.g., on-site in-house, off-site in-house, off-site contractor)? An off-site contract lab is used.

q. How are the samples maintained prior to analyses (i.e., refrigerated, secured, etc.)? The samples are kept secure in the custody of Mr. Wright in a cooler until shipped to the laboratory.

r. How long are the samples held prior to transport to the laboratory? Mr. Wright explained that the samples would be shipped overnight to the laboratory the following day (12/5/01).

s. How are the samples transported/shipped to the laboratory (i.e., hand delivered, overnight express, etc.)? Samples are shipped overnight.

t. If the samples are not hand delivered, are sample seals attached to the containers or coolers to ensure that the samples are not tampered with while in transit? Yes

6. Quality Assurance/Quality Control

In completing this portion of the O & M Field Audit checklist, the HWP feels that the auditor should contact the responsible laboratory directly for a response to the following questions, realizing that the resulting response must be taken as fact. This procedure is recommended since the O & M Field Audit is not intended as a laboratory audit, but the overall content of the report would not be complete without the answers to the following:

a. Are laboratory logbooks maintained to track all phases of laboratory procedure from sample receipt through analysis, reporting, and disposition? Yes

b. Do the logbooks document the following:

Client name?	Yes
Date and time of sample receipt?	Yes
Sample number and analysis to be performed?	Yes
Observation of damaged/irregular samples received?	Yes
Sample preparation methods (e.g. extraction)?	Yes
Date and time of sample analysis initiation and completion?	Yes
Name of person performing each analytical step?	Yes
All QA/QC sample results?	Yes
Instrument calibration information?	Yes

c Describe all procedures used to ensure integrity of the samples in the laboratory prior to analysis: Samples are stored in a secure facility and internal chains-of-custody are used to monitor sample movement.

d Are all samples analyzed within EPA-specified holding times (e.g. SW-846)? Yes

e. If no to d, are holding time overruns reported on the final analysis results sheets? NA

f. Are all samples analyzed using an EPA-approved analytical method for each parameter? Yes

g. Is the analytical method used for each parameter documented? Yes

h. If a new analytical method is used, is it documented, with split samples analyzed using the old method for comparison purposes? NA

i. If any non-EPA analytical methods are commonly used, list the method(s) and their source document(s): NA

j. For replicate analyses (e.g., TOC, TOX), describe the lab method used to obtain the individual concentration values: Separate sample aliquots (duplicates for TOX; quadruplicates for TOC) are taken through the entire analytical process. Individual sample concentrations are then averaged to produce the final result.

k. Are appropriate QA/QC measures used in laboratory analyses (e.g., blanks, matrix spikes, standards, etc.)? Yes

l. Are detection limits and percent recovery for matrix spikes or controls reported for each sample parameter? Yes

APPENDIX B

Analytical Results

Inland Realty Enterprises, L.L.C.
Maryville, Missouri
December 4, 2001

STATE OF MISSOURI
Bob Holden, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0110943
Lab Number: 01-D4520

Reported To: LARRY LEHMAN
Affiliation: ESP
LDPR/Job-Project: QERCA/NJ00ILRL

Report Date: 12/20/01
Date Collected: 12/ 4/01
Date Received: 12/ 5/01

Sample Collected by: LARRY LEHMAN, ESP
Sampling Location: INLAND REALITY ENTERPRISES
Sample Description: WELL GMW #4D
County: NODAWAY

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	2,110	umhos/cm	12/ 4/01	120.1
Comment: Analyzed in Field				
pH	6.32		12/ 4/01	150.1
Comment: Analyzed in Field				
Temperature - C	14	Degrees C	12/ 4/01	
Comment: Analyzed in Field				
Silver, Total	< 5.00	ug/L	12/13/01	200.7
Arsenic, Total	3.9	ug/L	12/17/01	206.2
Barium, Total	78.0	ug/L	12/13/01	200.7
Cadmium, Total	< 1.00	ug/L	12/13/01	200.7
Chromium, Total	< 2.50	ug/L	12/13/01	200.7
Mercury, Total	< 0.20	ug/L	12/13/01	245.1
Lead, Total	27.6	ug/L	12/13/01	239.2
Selenium, Total	1.2	ug/L	12/17/01	270.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Earl Pabst

Earl Pabst, Program Director
Environmental Services Program
Air and Land Protection Division

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI
Bob Holden, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0110944
Lab Number: 01-D4521

Reported To: LARRY LEHMAN
Affiliation: ESP
LDPR/Job-Project: QERCA/NJ00ILRL

Report Date: 12/20/01
Date Collected: 12/ 4/01
Date Received: 12/ 5/01

Sample Collected by: LARRY LEHMAN, ESP
Sampling Location: INLAND REALITY ENTERPRISES
Sample Description: WELL GMW #4S
County: NODAWAY

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	3,660	umhos/cm	12/ 4/01	120.1
Comment: Analyzed in Field				
pH	6.05		12/ 4/01	150.1
Comment: Analyzed in Field				
Temperature - C	16	Degrees C	12/ 4/01	
Comment: Analyzed in Field				
Silver, Total	< 5.00	ug/L	12/13/01	200.7
Arsenic, Total	< 1.2	ug/L	12/17/01	206.2
Barium, Total	57.7	ug/L	12/13/01	200.7
Cadmium, Total	11.5	ug/L	12/13/01	200.7
Chromium, Total	46.2	ug/L	12/13/01	200.7
Mercury, Total	< 0.20	ug/L	12/13/01	245.1
Lead, Total	49.8	ug/L	12/13/01	239.2
Selenium, Total	2.4	ug/L	12/17/01	270.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Earl Pabst

Earl Pabst, Program Director
Environmental Services Program
Air and Land Protection Division

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI

Bob Holden, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0110945
Lab Number: 01-D4522

Reported To: LARRY LEHMAN
Affiliation: ESP
LDPR/Job-Project: QERCA/NJ00ILRL

Report Date: 1/ 2/02
Date Collected: 12/ 4/01
Date Received: 12/ 5/01

Sample Collected by: LARRY LEHMAN, ESP
Sampling Location: INLAND REALITY ENTERPRISES
Sample Description: WELL GMW #5S
County: NODAWAY

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	4,580	umhos/cm	12/ 4/01	120.1
Comment: Analyzed in Field				
pH	6.31		12/ 4/01	150.1
Comment: Analyzed in Field				
Temperature - C	15	Degrees C	12/ 4/01	
Comment: Analyzed in Field				
Silver, Total	< 5.00	ug/L	12/13/01	200.7
Arsenic, Total	3.2	ug/L	12/17/01	206.2
Barium, Total	479	ug/L	12/13/01	200.7
Cadmium, Total	1.47	ug/L	12/13/01	200.7
Chromium, Total	< 2.50	ug/L	12/13/01	200.7
Mercury, Total	< 0.20	ug/L	12/28/01	245.1
Lead, Total	26.7	ug/L	12/13/01	239.2
Selenium, Total	1.4	ug/L	12/17/01	270.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Earl Pabst

Earl Pabst, Program Director
Environmental Services Program
Air and Land Protection Division

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI
Bob Holden, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0110946
Lab Number: 01-D4523

Reported To: LARRY LEHMAN
Affiliation: ESP
LDPR/Job-Project: QERCA/NJ00ILRL

Report Date: 1/ 2/02
Date Collected: 12/ 4/01
Date Received: 12/ 5/01

Sample Collected by: LARRY LEHMAN, ESP
Sampling Location: INLAND REALITY ENTERPRISES
Sample Description: WELL GMW #5S (DUPLICATE)
County: NODAWAY

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	4,580	umhos/cm	12/ 4/01	120.1
Comment: Analyzed in Field				
pH	6.31		12/ 4/01	150.1
Comment: Analyzed in Field				
Temperature - C	15	Degrees C	12/ 4/01	
Comment: Analyzed in Field				
Silver, Total	< 5.00	ug/L	12/13/01	200.7
Arsenic, Total	2.9	ug/L	12/17/01	206.2
Barium, Total	438	ug/L	12/13/01	200.7
Cadmium, Total	1.04	ug/L	12/13/01	200.7
Chromium, Total	< 2.50	ug/L	12/13/01	200.7
Mercury, Total	< 0.20	ug/L	12/28/01	245.1
Lead, Total	28.3	ug/L	12/13/01	239.2
Selenium, Total	1.2	ug/L	12/17/01	270.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Earl Pabst

Earl Pabst, Program Director
Environmental Services Program
Air and Land Protection Division

c: KATHY FLIPPIN, HWP

STATE OF MISSOURI

Bob Holden, Governor • Stephen M. Mahfood, Director

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102-0176

ENVIRONMENTAL SERVICES PROGRAM

RESULTS OF SAMPLE ANALYSES

Sample Number: 0110947
Lab Number: 01-D4524

Reported To: LARRY LEHMAN
Affiliation: ESP
LDPR/Job-Project: QERCA/NJ00ILRL

Report Date: 12/20/01
Date Collected: 12/ 4/01
Date Received: 12/ 5/01

Sample Collected by: LARRY LEHMAN, ESP
Sampling Location: INLAND REALITY ENTERPRISES
Sample Description: WELL GMW #9
County: NODAWAY

Analysis Performed	Results		Analyzed	Method
Specific Conductivity	1,460	umhos/cm	12/ 4/01	120.1
Comment: Analyzed in Field				
pH	6.32		12/ 4/01	150.1
Comment: Analyzed in Field				
Temperature - C	17	Degrees C	12/ 4/01	
Comment: Analyzed in Field				
Silver, Total	< 5.00	ug/L	12/13/01	200.7
Arsenic, Total	3.4	ug/L	12/17/01	206.2
Barium, Total	674	ug/L	12/13/01	200.7
Cadmium, Total	< 1.00	ug/L	12/13/01	200.7
Chromium, Total	7.08	ug/L	12/13/01	200.7
Mercury, Total	< 0.20	ug/L	12/13/01	245.1
Lead, Total	22.0	ug/L	12/13/01	239.2
Selenium, Total	1.1	ug/L	12/17/01	270.2

The analysis of this sample was performed in accordance with procedures approved or recognized by the U.S. Environmental Protection Agency.

Earl Pabst

Earl Pabst, Program Director
Environmental Services Program
Air and Land Protection Division

c: KATHY FLIPPIN, HWP

APPENDIX G

LABORATORY ANALYTICAL DATA

TWE : 3050.003
#4 1HD
2002

SEVERN TRENT SERVICES

STL St. Louis
13715 Rider Trail North
Earth City, MO 63045

Tel 314 298 8566
Fax 314 298 8757
www.stl-inc.com

ANALYTICAL REPORT

Inland Realty Co.

Lot #: F1L060283

Bill Wright

O'Brien & Gere Engineers, Inc.
12250 Weber Hill Rd.
St. Louis, MO 63127

SEVERN TRENT LABORATORIES, INC.

MARTI WARD
Project Manager

December 28, 2001

Case Narrative
LOT NUMBER: **F1L060283**

This report contains the analytical results for the five samples received under chain of custody by STL St. Louis on December 6, 2001. These samples are associated with your Inland Realty Co. project.

All applicable quality control procedures met method-specified acceptance criteria except as noted below.

This report is incomplete without the case narrative. All results are based upon sample as received, wet weight, unless noted otherwise.

Observations/Nonconformances

Reference the chain of custody and condition upon receipt report for any variations on receipt conditions and temperature of samples on receipt.

The zinc analysis was performed using method 6010B.

METHODS SUMMARY

F1L060283

PARAMETER	ANALYTICAL METHOD	PREPARATION METHOD
ICP-MS (6020)	SW846 6020	SW846 3010
Mercury in Liquid Waste (Manual Cold-Vapor)	SW846 7470A	SW846 7470A
Total Cyanide	MCAWW 335.2	MCAWW 335.2

References:

MCAWW "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.

SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

F1L060283

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
EP3RF	001	GMW#4S	12/04/01	13:20
EP3RV	002	GMW#4D	12/04/01	11:45
EP3R1	003	GMW#5S	12/04/01	14:20
EP3R3	004	GMW#9	12/04/01	15:35
EP3R4	005	GMW#10	12/04/01	15:50

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

O'BRIEN & GERE ENGINEERS

Client Sample ID: GMW#4S

General Chemistry

Lot-Sample #...: F1L060283-001 **Work Order #...:** EP3RF **Matrix.....:** WATER
Date Sampled...: 12/04/01 13:20 **Date Received..:** 12/06/01

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Cyanide	ND	5.0	ug/L	MCAWW 335.2	12/10/01	1344534

Dilution Factor: 1 Analysis Time..: 00:00

O'BRIEN & GERE ENGINEERS

Client Sample ID: GMW#4D

General Chemistry

Lot-Sample #...: F1L060283-002 **Work Order #...:** EP3RV **Matrix.....:** WATER
Date Sampled...: 12/04/01 11:45 **Date Received..:** 12/06/01

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Cyanide	ND	5.0	ug/L	MCAWW 335.2	12/10/01	1344534

Dilution Factor: 1 Analysis Time..: 00:00

O'BRIEN & GERR ENGINEERS

Client Sample ID: GMW#5S

General Chemistry

Lot-Sample #...: F1L060283-003 **Work Order #...:** EP3R1 **Matrix.....:** WATER
Date Sampled...: 12/04/01 14:20 **Date Received..:** 12/06/01

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Cyanide	ND	5.0	ug/L	MCAWW 335.2	12/10/01	1344534

Dilution Factor: 1 Analysis Time..: 00:00

O'BRIEN & GERE ENGINEERS

Client Sample ID: GMW#9

General Chemistry

Lot-Sample #...: F1L060283-004 **Work Order #...:** EP3R3 **Matrix.....:** WATER
Date Sampled...: 12/04/01 15:35 **Date Received..:** 12/06/01

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Cyanide	ND	5.0	ug/L	MCAWW 335.2	12/10/01	1344534

Dilution Factor: 1 Analysis Time..: 00:00

O'BRIEN & GERE ENGINEERS

Client Sample ID: GMW#10

General Chemistry

Lot-Sample #...: F1L060283-005 **Work Order #...:** EP3R4 **Matrix.....:** WATER
Date Sampled...: 12/04/01 15:50 **Date Received..:** 12/06/01

PARAMETER	RESULT	RL	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Cyanide	ND	5.0	ug/L	MCAWW 335.2	12/10/01	1344534

Dilution Factor: 1 Analysis Time..: 00:00

O'BRIEN & GERE ENGINEERS

Client Sample ID: GMW#4S

TOTAL Metals

Lot-Sample #...: F1L060283-001 **Matrix.....:** WATER
Date Sampled...: 12/04/01 13:20 **Date Received..:** 12/06/01

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1341386						
Chromium	**14.7**	**5**	**ug/L**	**SW846 6020**	**12/07-12/21/01**	**EP3RF1AE**
		Dilution Factor: 2		Analysis Time..: 17:08		
Manganese	**73400**	**5**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP3RF1AF**
		Dilution Factor: 2		Analysis Time..: 21:35		
Nickel	**848**	**5**	**ug/L**	**SW846 6020**	**12/07-12/21/01**	**EP3RF1AG**
		Dilution Factor: 2		Analysis Time..: 17:08		
Lead	**1.4**	**2**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP3RF1AH**
		Dilution Factor: 2		Analysis Time..: 21:35		
Zinc	**2020**	**10.0**	**ug/L**	**SW846 6020**	**12/07-12/26/01**	**EP3RF1AJ**
		Dilution Factor: 1		Analysis Time..: 00:00		
Cadmium	**11.7**	**5**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP3RF1AD**
		Dilution Factor: 2		Analysis Time..: 21:35		
Prep Batch #...: 1344285						
Mercury	ND	0.20	ug/L	SW846 7470A	12/10-12/11/01	EP3RF1AC
		Dilution Factor: 1		Analysis Time..: 12:48		

O'BRIEN & GERE ENGINEERS

Client Sample ID: GMW#4D

TOTAL Metals

Lot-Sample #...: F1L060283-002
Date Sampled...: 12/04/01 11:45 **Date Received..:** 12/06/01
Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1341386						
Chromium	**1.2**	**5**	**ug/L**	**SW846 6020**	**12/07-12/21/01**	**EP3RV1AE**
		Dilution Factor: 2		Analysis Time..: 17:30		
Manganese	**1880**	**5**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP3RV1AF**
		Dilution Factor: 2		Analysis Time..: 21:58		
Nickel	**10.2**	**5**	**ug/L**	**SW846 6020**	**12/07-12/21/01**	**EP3RV1AG**
		Dilution Factor: 2		Analysis Time..: 17:30		
Lead	**0.64**	**2**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP3RV1AH**
		Dilution Factor: 2		Analysis Time..: 21:58		
Zinc	ND	10.0	ug/L	SW846 6020	12/07-12/26/01	EP3RV1AJ
		Dilution Factor: 1		Analysis Time..: 00:00		
Cadmium	ND	5	ug/L	SW846 6020	12/07-12/19/01	EP3RV1AD
		Dilution Factor: 2		Analysis Time..: 21:58		
Prep Batch #...: 1344285						
Mercury	ND	0.20	ug/L	SW846 7470A	12/10-12/11/01	EP3RV1AC
		Dilution Factor: 1		Analysis Time..: 12:50		

O'BRIEN & GERE ENGINEERS

Client Sample ID: GMW#5S

TOTAL Metals

Lot-Sample #...: F1L060283-003 **Matrix.....:** WATER
Date Sampled...: 12/04/01 14:20 **Date Received..:** 12/06/01

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1341386						
Chromium	**3.5**	**5**	**ug/L**	**SW846 6020**	**12/07-12/21/01**	**EP3R11AE**
		Dilution Factor: 2		Analysis Time..: 17:34		
Manganese	**334**	**5**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP3R11AF**
		Dilution Factor: 2		Analysis Time..: 22:01		
Nickel	**27.0**	**5**	**ug/L**	**SW846 6020**	**12/07-12/21/01**	**EP3R11AG**
		Dilution Factor: 2		Analysis Time..: 17:34		
Lead	**0.41**	**2**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP3R11AH**
		Dilution Factor: 2		Analysis Time..: 22:01		
Zinc	ND	10.0	ug/L	SW846 6020	12/07-12/26/01	EP3R11AJ
		Dilution Factor: 1		Analysis Time..: 00:00		
Cadmium	**0.83**	**5**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP3R11AD**
		Dilution Factor: 2		Analysis Time..: 22:01		
Prep Batch #...: 1344285						
Mercury	ND	0.20	ug/L	SW846 7470A	12/10-12/11/01	EP3R11AC
		Dilution Factor: 1		Analysis Time..: 12:52		

O'BRIEN & GERE ENGINEERS

Client Sample ID: GMW#9

TOTAL Metals

Lot-Sample #...: F1L060283-004 **Matrix.....:** WATER
Date Sampled...: 12/04/01 15:35 **Date Received..:** 12/06/01

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1341386						
Chromium	**4.9**	**5**	**ug/L**	**SW846 6020**	**12/07-12/21/01**	**EP3R31AE**
		Dilution Factor: 2		Analysis Time..: 17:37		
Manganese	**1070**	**5**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP3R31AF**
		Dilution Factor: 2		Analysis Time..: 22:05		
Nickel	**11.0**	**5**	**ug/L**	**SW846 6020**	**12/07-12/21/01**	**EP3R31AG**
		Dilution Factor: 2		Analysis Time..: 17:37		
Lead	**3.0**	**2**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP3R31AH**
		Dilution Factor: 2		Analysis Time..: 22:05		
Zinc	**24.6**	**10.0**	**ug/L**	**SW846 6020**	**12/07-12/26/01**	**EP3R31AJ**
		Dilution Factor: 1		Analysis Time..: 00:00		
Cadmium	ND	5	ug/L	SW846 6020	12/07-12/19/01	EP3R31AD
		Dilution Factor: 2		Analysis Time..: 22:05		
Prep Batch #...: 1344285						
Mercury	ND	0.20	ug/L	SW846 7470A	12/10-12/11/01	EP3R31AC
		Dilution Factor: 1		Analysis Time..: 12:54		

O'BRIEN & GERE ENGINEERS

Client Sample ID: GMW#10

TOTAL Metals

Lot-Sample #...: F1L060283-005 **Matrix.....:** WATER
Date Sampled...: 12/04/01 15:50 **Date Received..:** 12/06/01

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
Prep Batch #...: 1341386						
Chromium	**1.7**	**5**	**ug/L**	**SW846 6020**	**12/07-12/21/01**	**EP3R41AE**
		Dilution Factor: 2		Analysis Time..: 17:40		
Manganese	**6.5**	**5**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP3R41AF**
		Dilution Factor: 2		Analysis Time..: 22:08		
Nickel	ND	5	ug/L	SW846 6020	12/07-12/21/01	EP3R41AG
		Dilution Factor: 2		Analysis Time..: 17:40		
Lead	**0.65**	**2**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP3R41AH**
		Dilution Factor: 2		Analysis Time..: 22:08		
Zinc	ND	10.0	ug/L	SW846 6020	12/07-12/26/01	EP3R41AJ
		Dilution Factor: 1		Analysis Time..: 00:00		
Cadmium	ND	5	ug/L	SW846 6020	12/07-12/19/01	EP3R41AD
		Dilution Factor: 2		Analysis Time..: 22:08		
Prep Batch #...: 1344285						
Mercury	ND	0.20	ug/L	SW846 7470A	12/10-12/11/01	EP3R41AC
		Dilution Factor: 1		Analysis Time..: 12:56		

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: F1L060283 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: F1L070000-386 **Prep Batch #...:** 1341386						
Chromium	**1.6**	**5**	**ug/L**	**SW846 6020**	**12/07-12/21/01**	**EP5QR1AC**
		Dilution Factor: 1				
		Analysis Time..: 17:01				
Lead	ND	2	ug/L	SW846 6020	12/07-12/19/01	EP5QR1AF
		Dilution Factor: 1				
		Analysis Time..: 21:28				
Manganese	**1.5**	**5**	**ug/L**	**SW846 6020**	**12/07-12/19/01**	**EP5QR1AD**
		Dilution Factor: 1				
		Analysis Time..: 21:28				
Nickel	ND	5	ug/L	SW846 6020	12/07-12/21/01	EP5QR1AE
		Dilution Factor: 1				
		Analysis Time..: 17:01				
Zinc	ND	10.0	ug/L	SW846 6020	12/07-12/26/01	EP5QR1AG
		Dilution Factor: 1				
		Analysis Time..: 00:00				
Cadmium	ND	5	ug/L	SW846 6020	12/07-12/19/01	EP5QR1AA
		Dilution Factor: 1				
		Analysis Time..: 21:28				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

TOTAL Metals

Client Lot #...: F1L060283

Matrix.....: WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
MB Lot-Sample #: F1L100000-285	**Prep Batch #...:** 1344285					
Mercury	ND	0.2	ug/L	SW846 7470A	12/10-12/11/01	EP8CW1AA
		Dilution Factor: 1				
		Analysis Time..: 12:25				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: F1L060283 **Matrix.....:** WATER

PARAMETER	RESULT	REPORTING LIMIT	UNITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Cyanide		Work Order #: EP81R1AA		MB Lot-Sample #:	F1L100000-534	
	ND	5.0	ug/L	MCAWW 335.2	12/10/01	1344534
		Dilution Factor: 1				
		Analysis Time..: 00:00				

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Lot-Sample #...: F1L060283 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP-BATCH #
Mercury	98	(80 - 120)			SW846 7470A	12/10-12/11/01	1344285
	96	(80 - 120)	2.8	(0-20)	SW846 7470A	12/10-12/11/01	1344285

Dilution Factor: 1

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: F1L060283 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: F1L070000-386 **Prep Batch #...:** 1341386					
Chromium	100	(80 - 120)	SW846 6020 Dilution Factor: 2 Analysis Time..: 17:05	12/07-12/21/01	EP5QR1AJ
Manganese	100	(80 - 120)	SW846 6020 Dilution Factor: 2 Analysis Time..: 21:32	12/07-12/19/01	EP5QR1AK
Nickel	97	(80 - 120)	SW846 6020 Dilution Factor: 2 Analysis Time..: 17:05	12/07-12/21/01	EP5QR1AL
Lead	99	(80 - 120)	SW846 6020 Dilution Factor: 2 Analysis Time..: 21:32	12/07-12/19/01	EP5QR1AM
Zinc	100	(80 - 120)	SW846 6020 Dilution Factor: 1 Analysis Time..: 00:00	12/07-12/26/01	EP5QR1AN
Cadmium	99	(80 - 120)	SW846 6020 Dilution Factor: 2 Analysis Time..: 21:32	12/07-12/19/01	EP5QR1AH

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

TOTAL Metals

Client Lot #...: F1L060283 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	WORK ORDER #
LCS Lot-Sample#: F1L070000-386 **Prep Batch #...:** 1341386					
Chromium	100	(80 - 120)	SW846 6020 Dilution Factor: 2 Analysis Time..: 17:05	12/07-12/21/01	EP5QR1AJ
Manganese	100	(80 - 120)	SW846 6020 Dilution Factor: 2 Analysis Time..: 21:32	12/07-12/19/01	EP5QR1AK
Nickel	97	(80 - 120)	SW846 6020 Dilution Factor: 2 Analysis Time..: 17:05	12/07-12/21/01	EP5QR1AL
Lead	99	(80 - 120)	SW846 6020 Dilution Factor: 2 Analysis Time..: 21:32	12/07-12/19/01	EP5QR1AM
Zinc	100	(80 - 120)	SW846 6020 Dilution Factor: 1 Analysis Time..: 00:00	12/07-12/26/01	EP5QR1AN
Cadmium	99	(80 - 120)	SW846 6020 Dilution Factor: 2 Analysis Time..: 21:32	12/07-12/19/01	EP5QR1AH

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #...: F1L060283 **Matrix.....:** WATER

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD	PREPARATION-ANALYSIS DATE	PREP BATCH #
Total Cyanide		Work Order #: EP81R1AC	LCS Lot-Sample#: F1L100000-534		
	98	(80 - 120)	MCAWW 335.2	12/10/01	1344534
		Dilution Factor: 1			
		Analysis Time..: 00:00			

NOTE(S):

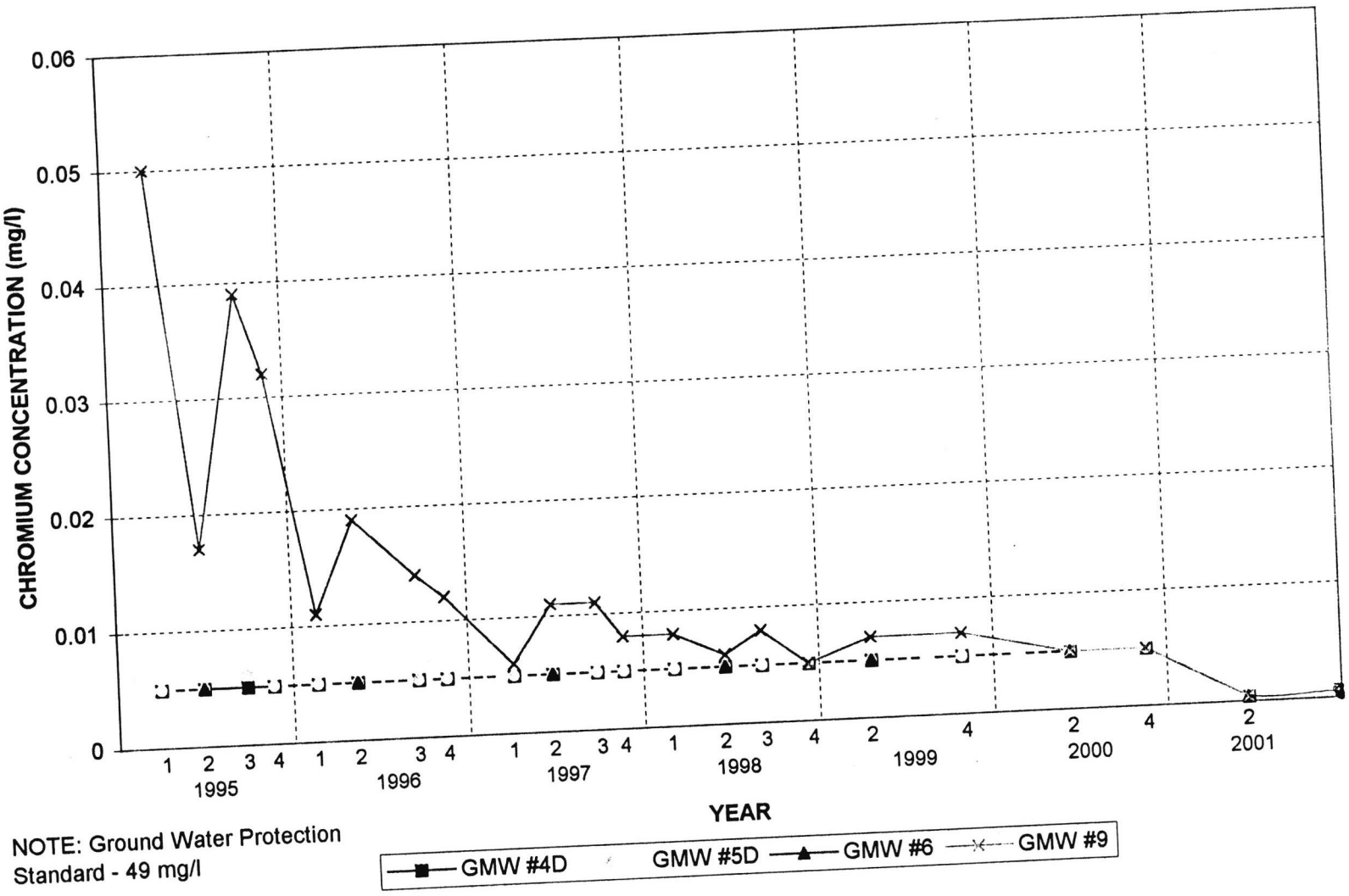
Calculations are performed before rounding to avoid round-off errors in calculated results.

APPENDIX H

CONTAMINANT TREND GRAPHS

INLAND REALTY - MARYVILLE, MISSOURI

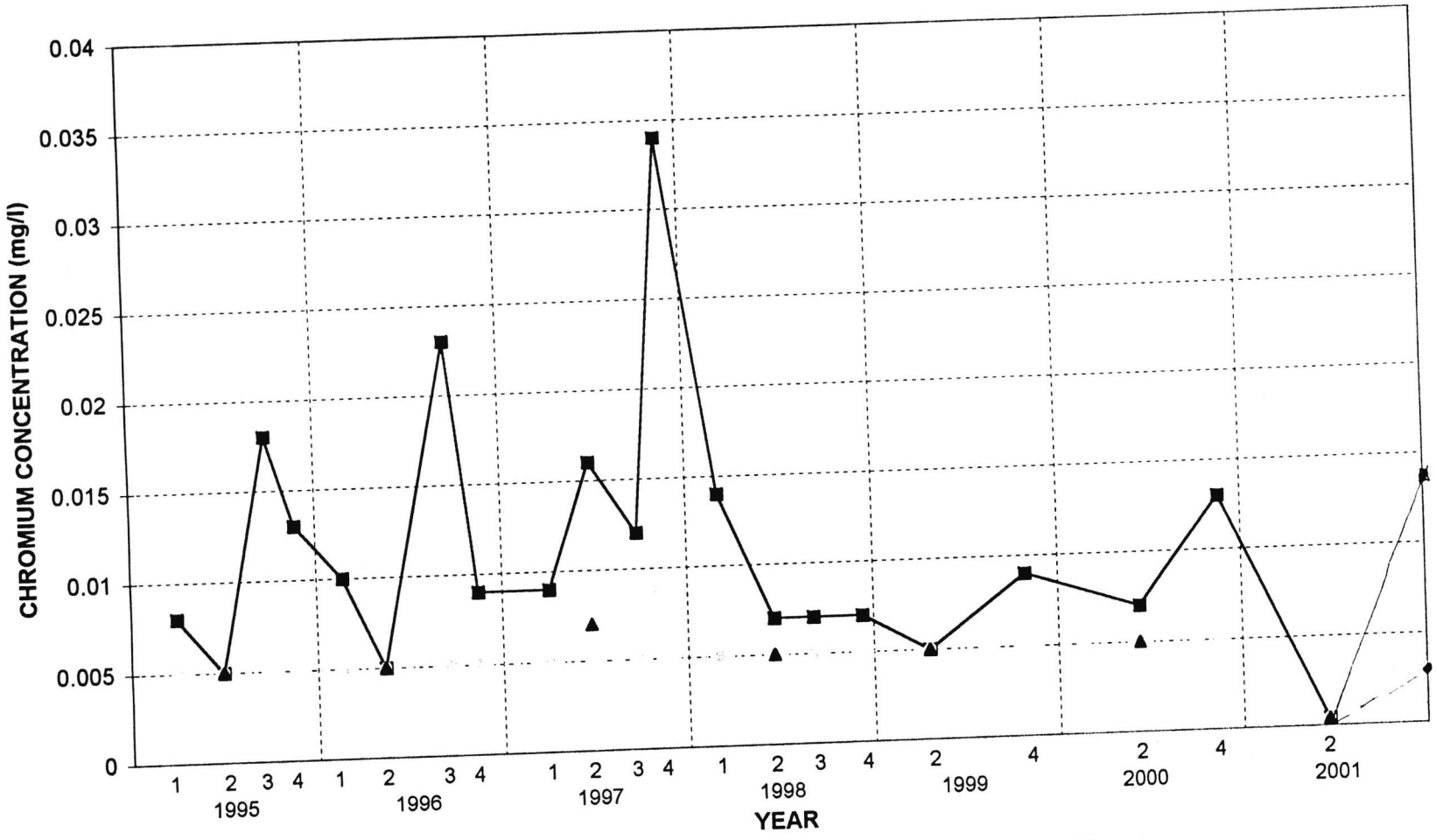
CHROMIUM CONCENTRATION - DEEP WELLS



NOTE: Ground Water Protection Standard - 49 mg/l

INLAND REALTY - MARYVILLE, MISSOURI

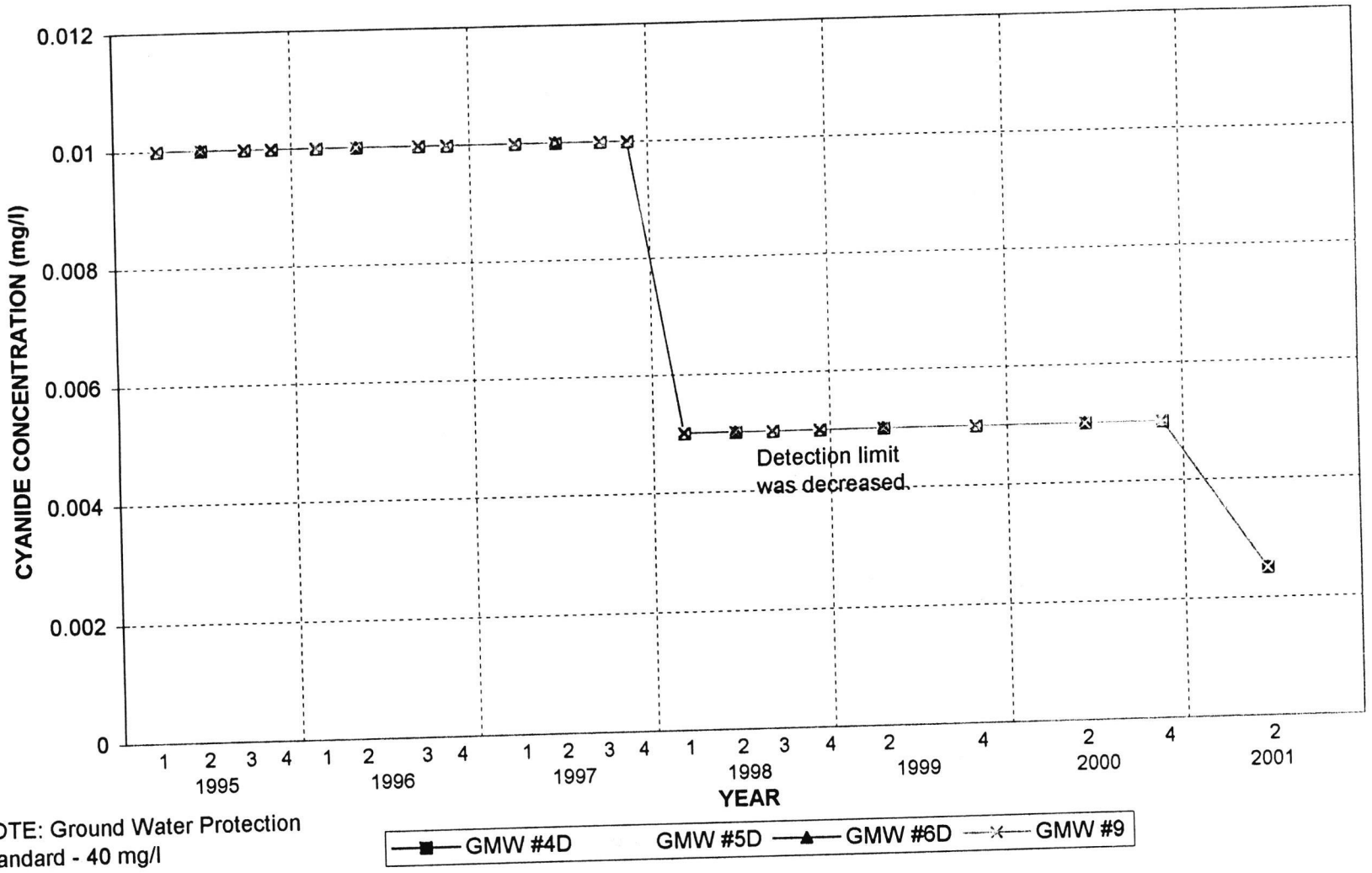
CHROMIUM CONCENTRATION - SHALLOW WELLS



NOTE: Ground Water Protection Standard - 49 mg/l

INLAND REALTY - MARYVILLE, MISSOURI

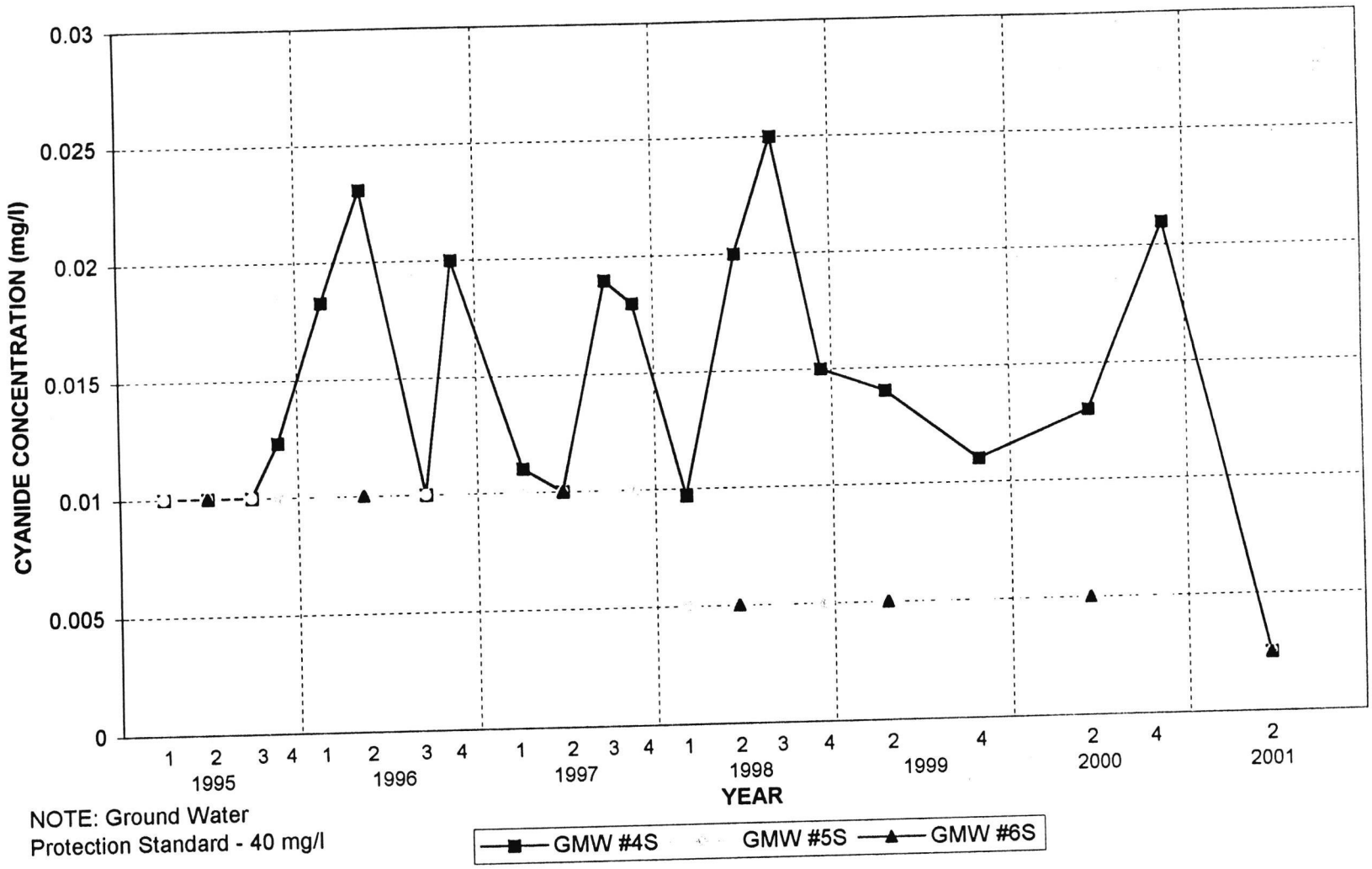
CYANIDE CONCENTRATION - DEEP WELLS



NOTE: Ground Water Protection Standard - 40 mg/l

INLAND REALTY - MARYVILLE, MISSOURI

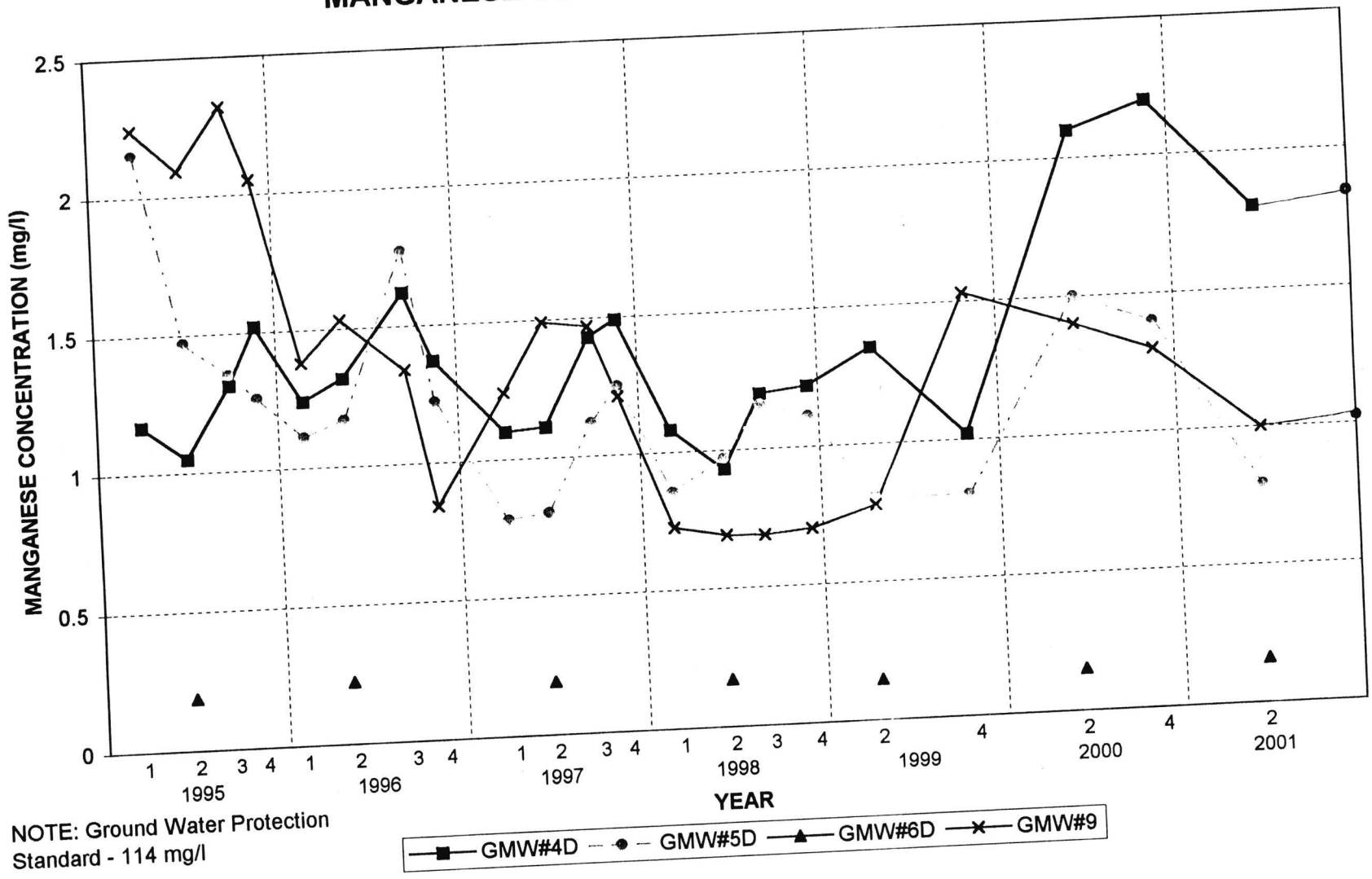
CYANIDE CONCENTRATION - SHALLOW WELLS



NOTE: Ground Water
Protection Standard - 40 mg/l

INLAND REALTY - MARYVILLE, MISSOURI

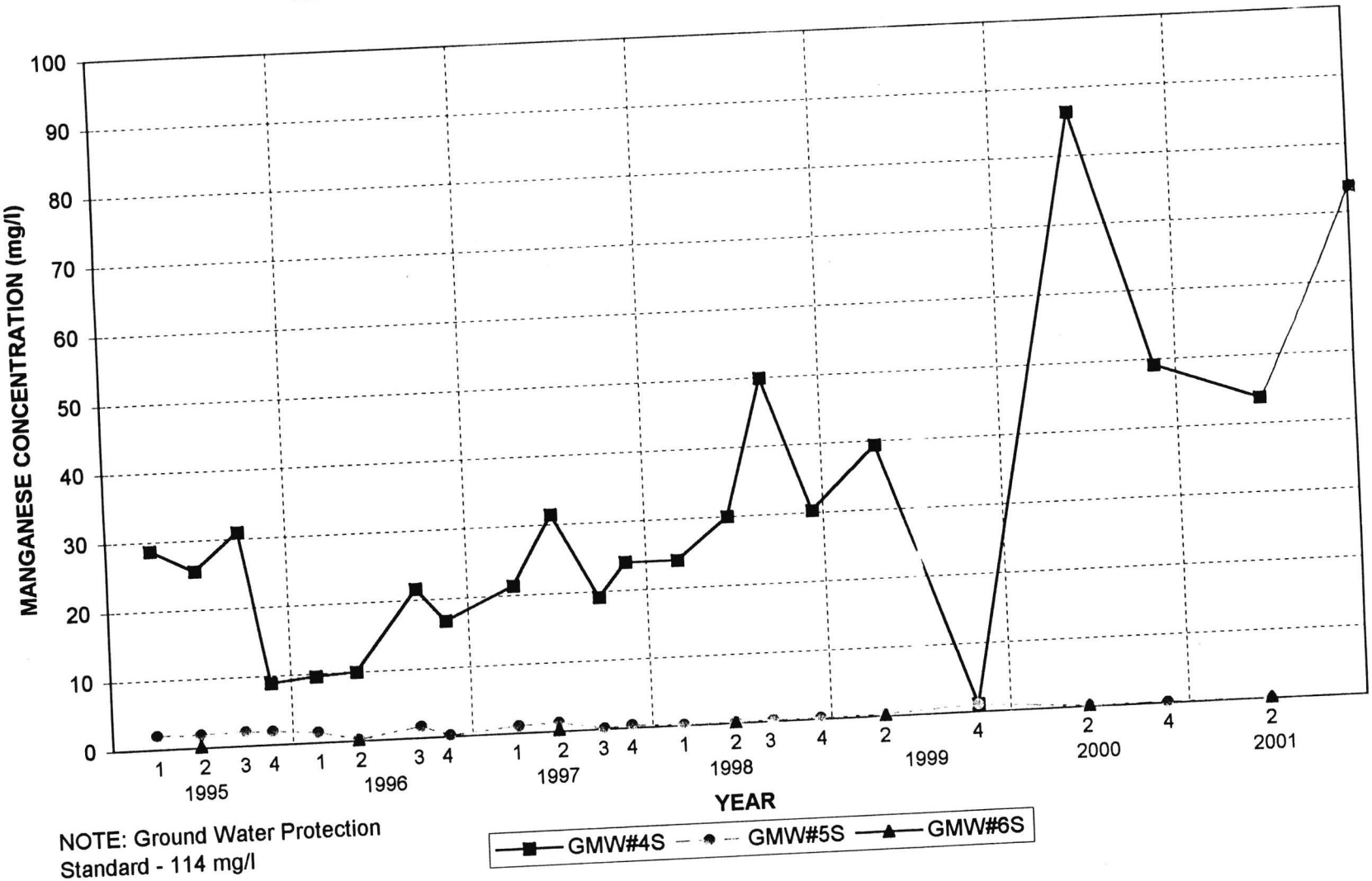
MANGANESE CONCENTRATION - DEEP WELLS



NOTE: Ground Water Protection Standard - 114 mg/l

INLAND REALTY - MARYVILLE, MISSOURI

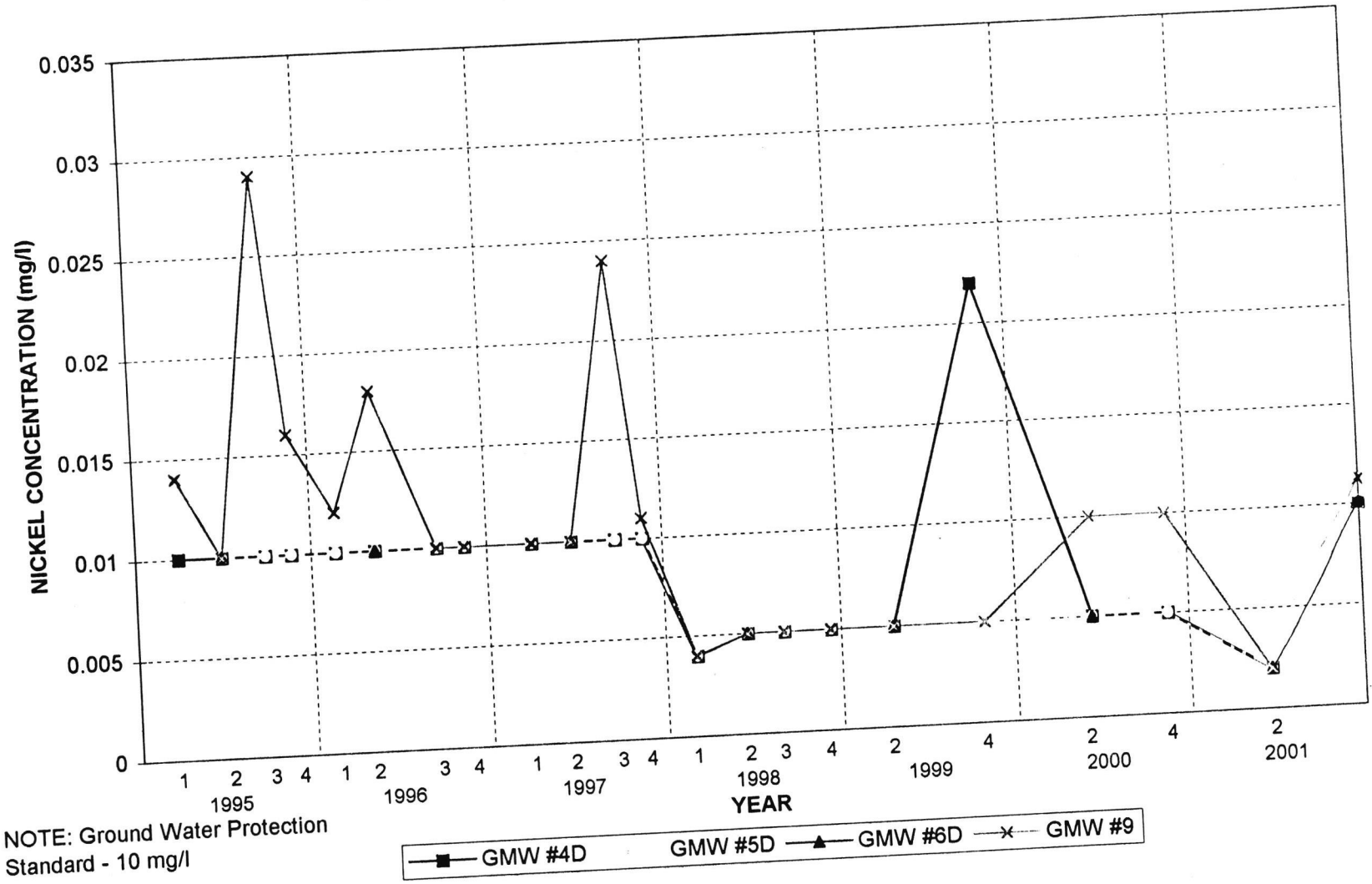
MANGANESE CONCENTRATION - SHALLOW WELLS



NOTE: Ground Water Protection Standard - 114 mg/l

INLAND REALTY - MARYVILLE, MISSOURI

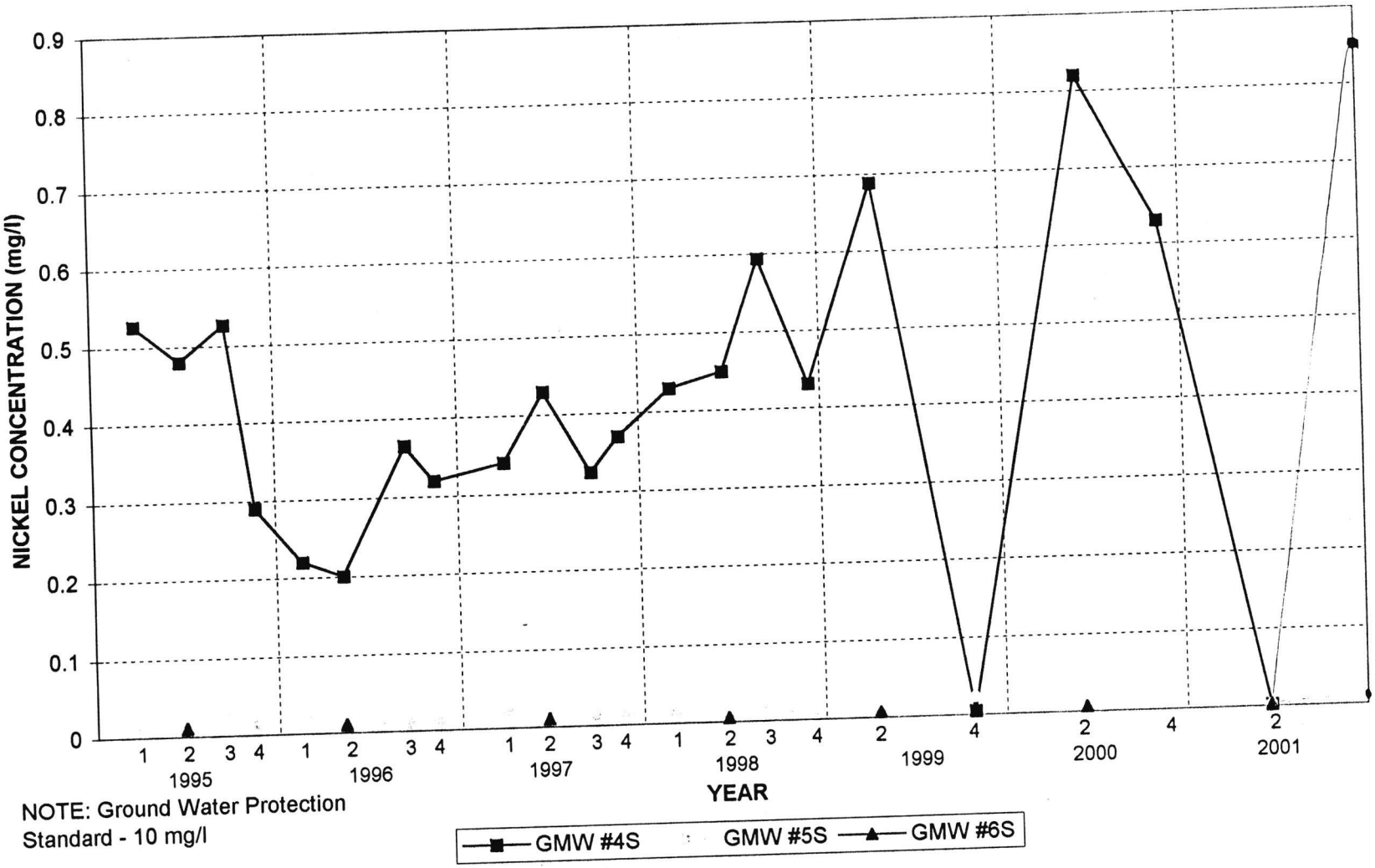
NICKEL CONCENTRATION - DEEP WELLS



NOTE: Ground Water Protection Standard - 10 mg/l

INLAND REALTY - MARYVILLE, MISSOURI

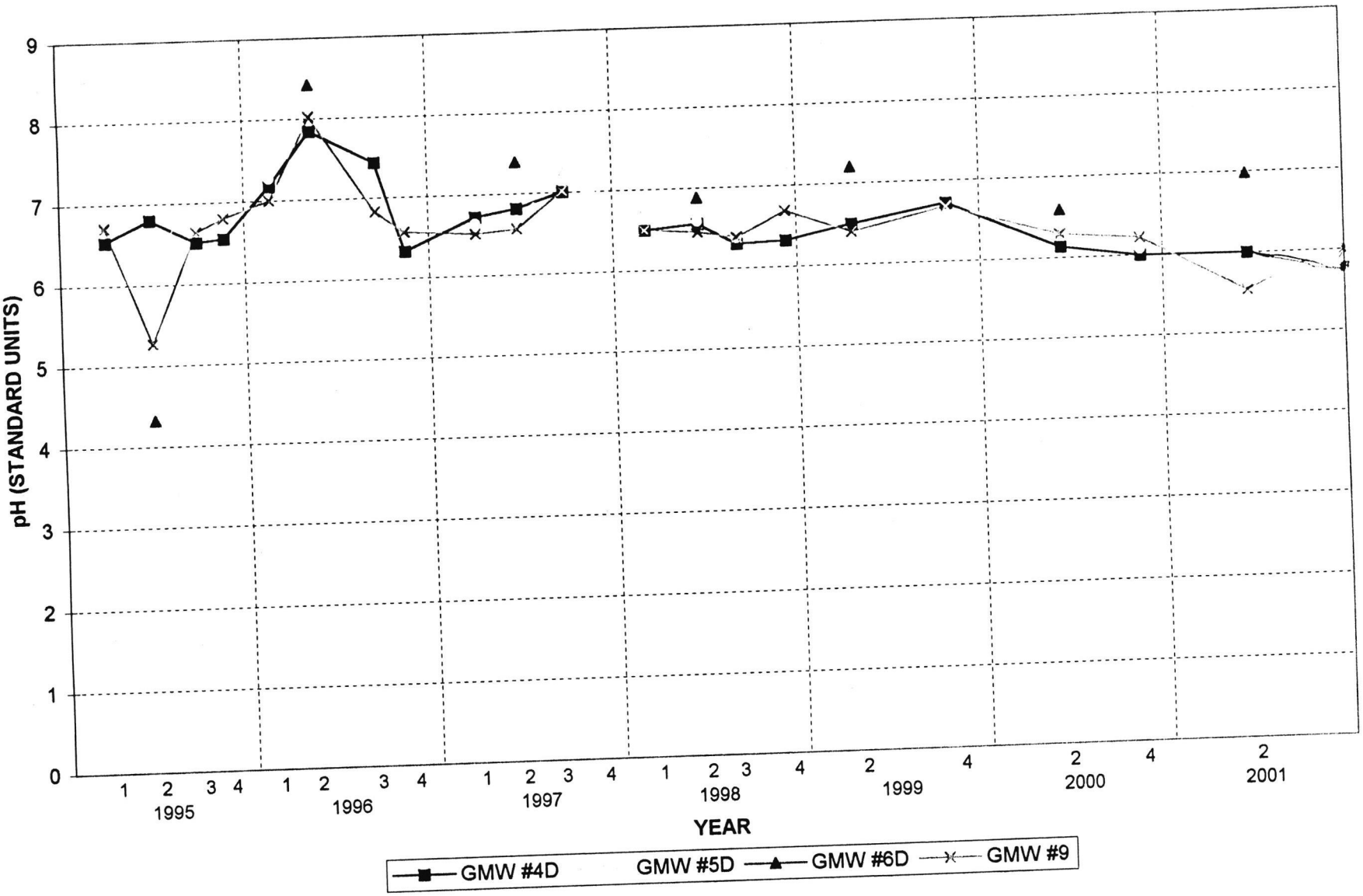
NICKEL CONCENTRATION - SHALLOW WELLS



NOTE: Ground Water Protection Standard - 10 mg/l

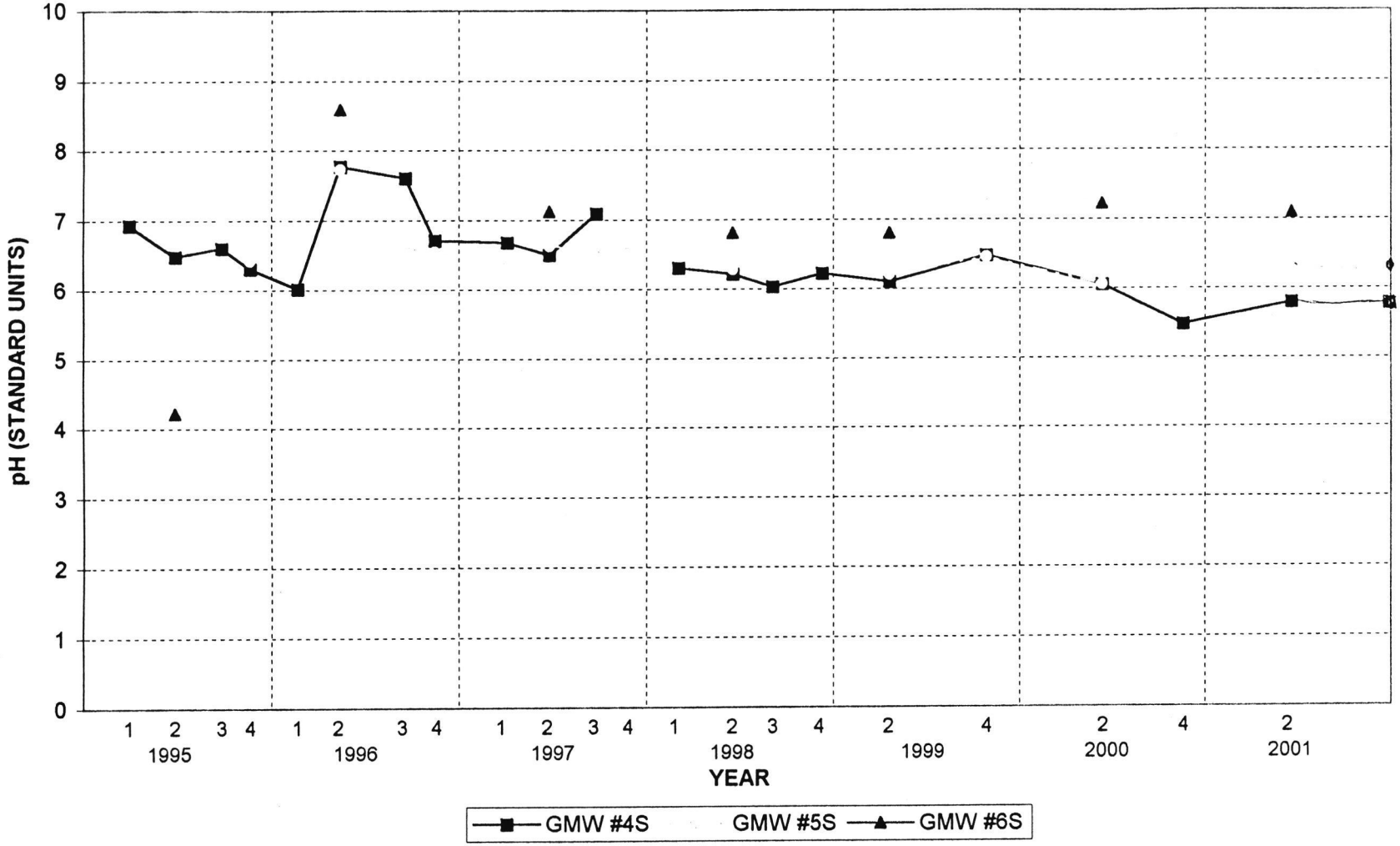
INLAND REALTY - MARYVILLE, MISSOURI

pH - DEEP WELLS



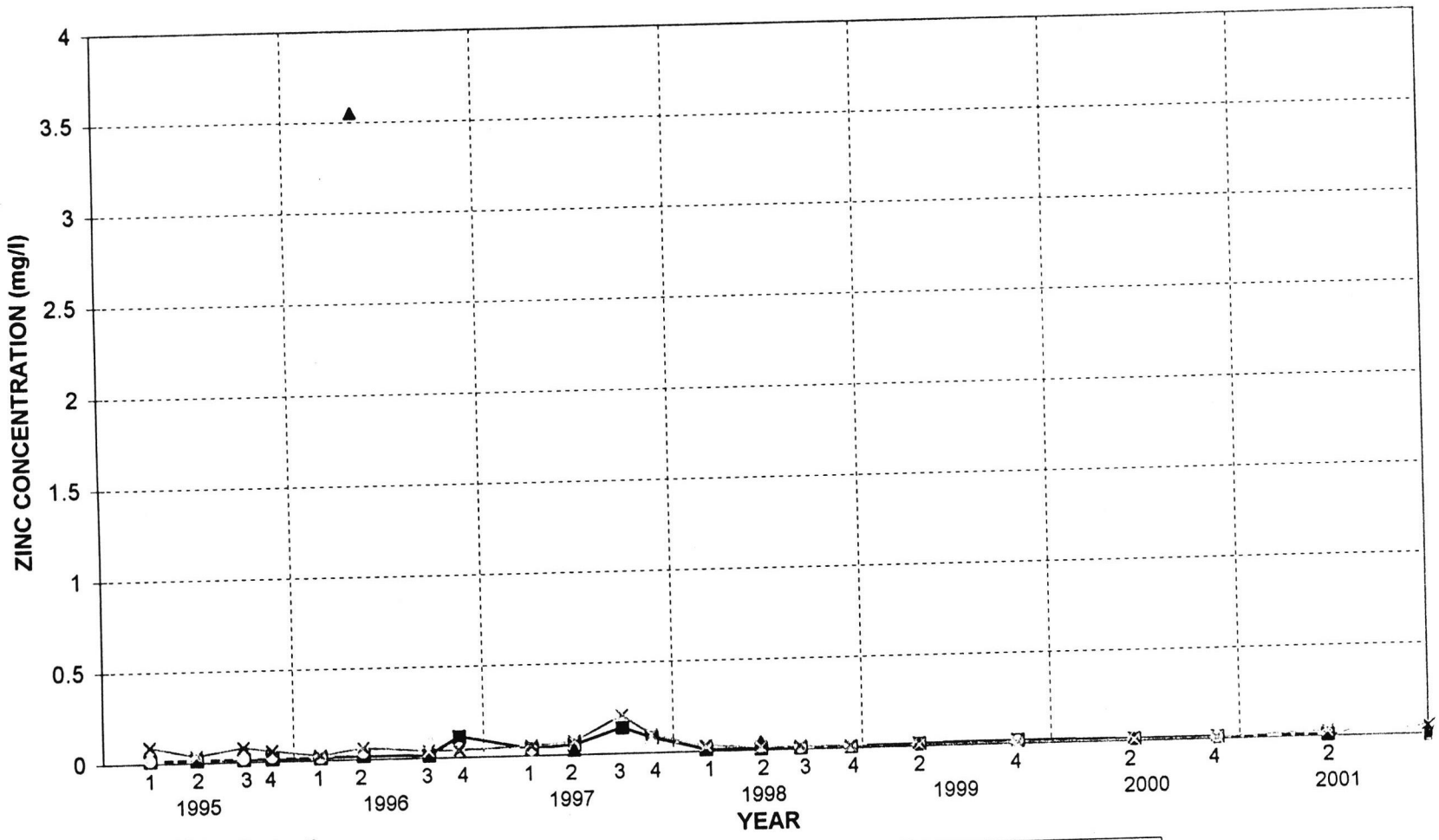
INLAND REALTY - MARYVILLE, MISSOURI

pH - SHALLOW WELLS



INLAND REALTY - MARYVILLE, MISSOURI

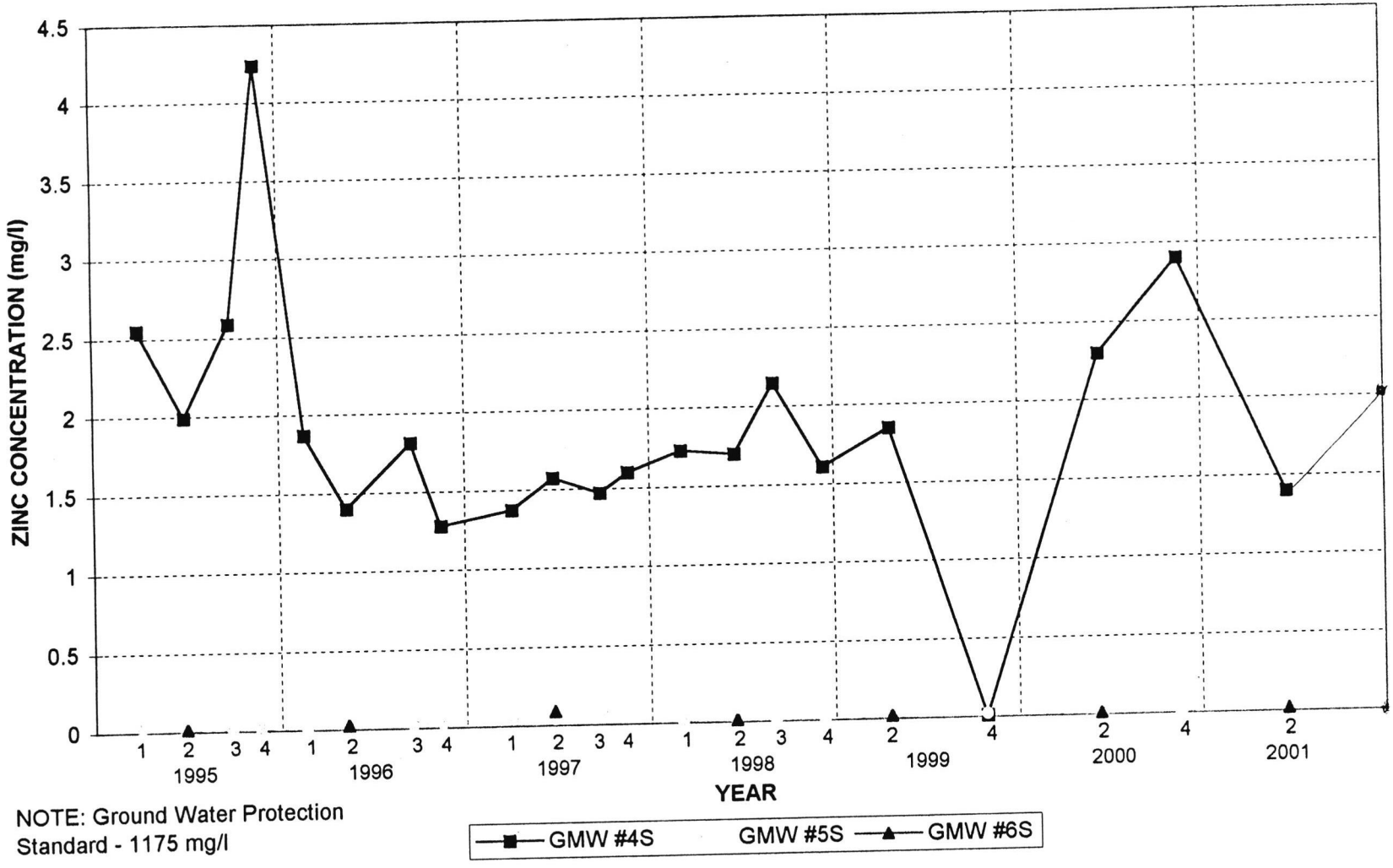
ZINC CONCENTRATION - DEEP WELLS



NOTE: Ground Water Protection Standard - 1175 mg/l

INLAND REALTY - MARYVILLE, MISSOURI

ZINC CONCENTRATION - SHALLOW WELLS



NOTE: Ground Water Protection Standard - 1175 mg/l

APPENDIX I

ANNUAL GROUNDWATER MONITORING REPORT REVIEW WORKSHEETS

2000 ANNUAL GROUNDWATER REPORT REVIEW
Prepared by
MISSOURI DEPARTMENT OF NATURAL RESOURCES
HAZARDOUS WASTE PROGRAM
GROUNDWATER UNIT

FACILITY: Inland Realty - Maryville, Missouri
ANNUAL REPORT SUBMISSION DATE: 03-01-01
DATE REVIEWED/REVIEWER: 11-20-02 Christine Kump-Mitchell
REGULATORY STATUS OF FACILITY: Post-Closure Permit

1.0 GROUNDWATER MONITORING SYSTEM DISCUSSION

1.1 Does the report contain a narrative discussion of the nature and evolution of the site groundwater monitoring system?
Report contains a good narrative of the history of groundwater monitoring, specifically the evolution from detection to assessment monitoring and all additions/deletions of the monitoring program. The report also discusses the changes in the monitoring system related to the implementation of the March 1999 Post-Closure Permit.

1.2 Does the report draw any conclusions regarding the adequacy of the monitoring system related to its' intended purpose?
Report concludes that current system adequately defines groundwater quality and conditions surrounding the former surface impoundment.

2.0 ARE THE FOLLOWING ITEMS CONTAINED IN THE ANNUAL REPORT:

2.1 Well location map? Yes.

2.2 Measured total depths of monitoring wells (at least annually)? Yes.

2.3 List of groundwater monitoring parameters? Yes.

2.4 Frequency of sampling for each parameter? Yes, monitoring wells 2S, 2D, 3, 3S, 3D, 4S, 4D, 5S, 5D and 9 are sampled semi-annually and monitoring wells 6S, 6D and 7 are sampled annually.

3.0 FOR EACH QUARTERLY/SEMI-ANNUAL/ANNUAL (AS APPROPRIATE) SAMPLING EVENT AT THE FACILITY, ARE THE FOLLOWING ITEMS CONTAINED IN THE ANNUAL REPORT?

3.1 Static groundwater elevations? Yes.

3.2 Groundwater elevation contour maps? Yes.

3.3 How many maps? Four - two each for upper and lower saturated alluvium.

3.4 Analytical results for each groundwater monitoring parameter? Yes. Has the facility included the raw data from the laboratory, or does the facility simply present a summary of the data?
Tabular summary provided in annual report, raw data with field log sheets submitted semi-annually.

3.5 Statistical evaluation of groundwater monitoring results as per detection monitoring regulations, approved assessment monitoring plan, or in the case of permitted facilities, the compliance monitoring plan?
Not performed since the facility progressed into assessment monitoring. MDNR requested that Inland provide contaminant trend graphs instead. Facility has provided adequate trend graphs for each significant upgradient and down gradient well in its program.

4.0 DESCRIPTION OF HYDRAULIC ZONES

4.1 How many hydraulically distinct "zones" does the facility recognize (note: In many cases, a facility will report three or four different "zones"; however, only one or two distinct "zones" may exist)?
Two hydraulic zones are monitored at the site. Though they might not be distinct, there is clearly a separation in water levels seen in the well clusters. Another hydraulic zone, the stratigraphicaly lower saturated glacial till, is currently not monitored by Inland.

4.2 Are the groundwater elevation contour maps (if included) sufficient to characterize the groundwater flow direction(s) in each zone?
Yes-flow in both saturated zones clearly flows southeast towards the 102 River.

5.0 GROUNDWATER FLOW PARAMETERS

5.1 Does the report include an evaluation of the horizontal gradient(s)? Yes. Horizontal flow direction(s)? Yes. Rate(s) of horizontal groundwater flow? Yes.

5.2 Does sufficient information exist to support these findings?
Inland determined the hydraulic conductivity (k) for five wells in both the shallow (2S, 3, 4S, 5S, and 6S) and deep zones (2D, 4D, 5D, 6D, and 7). The lowest k for the shallow zone was 1.64 gpd/ft^2 at monitoring well 4S (area showing highest concentration of contaminants) which is at the southeast corner of the former surface impoundment. The highest k for the shallow zone was 14.5 gpd/ft^2 at monitoring well 6S which is located at the southeast corner of the site (farthest well from the former lagoon). The average k value for the shallow zone being 6.27 gpd/ft^2. Using these k values, and effective porosity for the shallow zone of 0.18, and an average horizontal gradient of 0.006 ft/ft between monitoring wells 5S and 6S the calculated groundwater flow velocity for monitoring wells 4S and 6S are 2.68 ft/year and 23.59 ft/year, respectively. The average groundwater flow velocity for the shallow zone is 10.20 ft/year.

The lowest *k* for the deep zone was 5.6 gpd/ft^2 at monitoring well 4D(nested with 4S). The highest *k* for the deep zone was 47 gpd/ft^2 at monitoring well 6D (nested with 6S). The average *k* value for the deep zone being 15.86 gpd/ft^2. Using these *k* values, an effective porosity for the deep zone of 0.25, and an average horizontal flow gradient of 0.004 ft/ft between monitoring wells 5D and 6D the calculated groundwater flow velocity for monitoring wells 4D and 6D are 4.37 ft/year and 36.70 ft/year, respectively. The average groundwater flow velocity for the deep zone is 12.38 ft/year.

5.3 Does the report include an evaluation of the vertical gradient(s)? Yes. Vertical flow direction(s)? Yes. Rate(s) of vertical groundwater flow? Yes.

5.4 Does sufficient information exist to support these findings? Please explain.
The report contains a good table of vertical flow potential, using all the well clusters on site (2, 3, 4, 5, and 6). The results are given in a head difference not a vertical gradient. Wells #2 and #3clusters had an upward flow potential during both semi-annual sampling events. Wells #4 and #5 had a downward flow potential during both semi-annual sampling events. Well #6 cluster had a downward flow potential for the first half of 2000 and neutral flow for the second half of 2000.

6.0 WELLBORE SILTATION

6.1 Has an evaluation of measured well depth compared to documented well depth been performed? Yes

6.2 Does the evaluation consider potential issues related wellbore siltation? Yes

6.3 If there is a problem, does it discuss maintenance options, contingencies? (i.e., redevelopment, replacement, etc.)
A comparison between measures total well depths verses as-built screen bottom elevations was performed in June 2000. Percentage of well screen occlusion was less than 5% for all wells. Therefore, no well redevelopment was necessary.

7.0 O&M ACTIVITIES OF MONITORING SYSTEM

7.1 Does the report discuss monitoring well operation and maintenance activities that were conducted during the subject year? Please explain.
All wells were inspected during both sampling events and appeared to be in good condition.

7.2 Does the report contain a narrative "update" section, which discusses any new well installation, exploratory drilling, or characterization activities that occurred during the subject year? Does it discuss any discrepancies in previous characterization studies? Please explain.
No such field work was performed by Inland in 2000.

8.0 ASSESSMENT/COMPLIANCE STATUS (APPROPRIATE FACILITIES)

8.1 How many hazardous waste constituents have been identified in the groundwater?
Several metal plating-related constituents.

8.2 Please list each identified constituent.
Manganese, Nickel, and Cadmium are definite hazardous constituents; Lead and Chromium have also possibly been released in the past. Other indictor parameters are a low pH and high zinc and sulfate levels within the plume.

8.3 Has the horizontal extent of contamination been determined? How is it presented in the report? Does it include concentrations of groundwater contaminants in each well?
Yes, the plume is concentrated between the MW-4 cluster and the southeast corner of the former impoundment. Trend graphs and isoconcetration maps provided by the facility are very helpful in determination of plume extent.

8.4 Has the vertical extent of contamination been determined? How is it presented in the report? Does it include concentrations of groundwater contaminants in each well?
Groundwater contaminants seem to be confined to the upper, fine-grained alluvium between MW-4S and the former impoundment. The plume apparently is still bound by clean wells directly under the hotspot and just downgradient; both screened in the more permeable saturated alluvial material.

8.5 Has the rate of contamination migration been presented? How was it determined? Is it sufficient to estimate the rate of contaminant transport?
No rates have been estimated/calculated by the facility in recent years. If the groundwater velocity calculations are accurate, the expected contaminant migration rate would be less than 3 feet per year, at monitoring well #4S, in the fine-grained alluvium towards the 102 River.

9.0 REMARKS

Inland Reality has completed 3 consecutive years of groundwater sampling under their Post-Closure Permit without exceeding their alternate concentration limits and has submitted at Class 3 Permit Modification request to be released from groundwater monitoring requirements and reduce the post closure period. Through careful hydrogeologic characterization, adequate groundwater monitoring well placement, and over ten years of groundwater monitoring and trend graphs Inland Realty has sufficiently demonstrated that the contaminant plume emanating from the surface impoundment has stabilized. Based on the relative immobility of metals and the silty sandy soil, migration of contaminants is anticipated to be minimal. Therefore, the department agrees to cessation of Inland Realty's groundwater monitoring requirements and reduction of the Post Closure Period pending completion of the Class 3 Permit Modification and public notice.

1999 ANNUAL GROUNDWATER REPORT REVIEW
Prepared by
MISSOURI DEPARTMENT OF NATURAL RESOURCES
HAZARDOUS WASTE PROGRAM
GROUNDWATER UNIT

FACILITY: Inland Realty - Maryville, Missouri
ANNUAL REPORT SUBMISSION DATE: 3-8-00
DATE REVIEWED/REVIEWER: 7-6-00 Chris Kump
REGULATORY STATUS OF FACILITY: Post-Closure Permit

1.0 GROUNDWATER MONITORING SYSTEM DISCUSSION

1.1 Does the report contain a narrative discussion of the nature and evolution of the site groundwater monitoring system?
Report contains a good narrative of the history of groundwater monitoring, specifically the evolution from detection to assessment monitoring and all additions/detections of the monitoring program. The report also discusses the changes in the monitoring system related to the implementation of the March 1999 Post-Closure Permit.

1.2 Does the report draw any conclusions regarding the adequacy of the monitoring system related to its' intended purpose?
Report concludes that current system adequately defines groundwater quality and conditions surrounding the former surface impoundment.

2.0 ARE THE FOLLOWING ITEMS CONTAINED IN THE ANNUAL REPORT:

2.1 Well location map? Yes.

2.2 Measured total depths of monitoring wells (at least annually)? Yes.

2.3 List of groundwater monitoring parameters? Yes.

2.4 Frequency of sampling for each parameter? Yes, monitoring wells 2S, 2D, 3, 3S, 3D, 4S, 4D, 5S, 5D and 9 are sampled semi-annually and monitoring wells 6S, 6D and 7 are sampled annually.

3.0 FOR EACH QUARTERLY/SEMI-ANNUAL/ANNUAL (AS APPROPRIATE) SAMPLING EVENT AT THE FACILITY, ARE THE FOLLOWING ITEMS CONTAINED IN THE ANNUAL REPORT?

3.1 Static groundwater elevations? Yes.

3.2 Groundwater elevation contour maps? Yes.

3.3 How many maps? Four - two each for upper and lower saturated alluvium.

3.4 Analytical results for each groundwater monitoring parameter? Yes. Has the facility included the raw data from the laboratory, or does the facility simply present a summary of the data?
Tabular summary provided in annual report, raw data with field log sheets submitted semi-annually.

3.5 Statistical evaluation of groundwater monitoring results as per detection monitoring regulations, approved assessment monitoring plan, or in the case of permitted facilities, the compliance monitoring plan?
Not performed since the facility progressed into assessment monitoring. MDNR requested that Inland provide contaminant trend graphs instead. Facility has provided adequate trend graphs for each significant upgradient and down gradient well in its program.

4.0 DESCRIPTION OF HYDRAULIC ZONES

4.1 How many hydraulically distinct "zones" does the facility recognize (note: In many cases, a facility will report three or four different "zones"; however, only one or two distinct "zones" may exist)?
Two hydraulic zones are monitored at the site. Though they might not be distinct, there is clearly a separation in water levels seen in the well clusters. Another hydraulic zone, the stratigraphicaly lower saturated glacial till, is currently not monitored by Inland.

4.2 Are the groundwater elevation contour maps (if included) sufficient to characterize the groundwater flow direction(s) in each zone?
Yes-flow in both saturated zones clearly flows southeast towards the 102 River.

5.0 GROUNDWATER FLOW PARAMETERS

5.1 Does the report include an evaluation of the horizontal gradient(s)? Yes. horizontal flow direction(s)? Yes. rate(s) of horizontal groundwater flow? Yes.

5.2.1 Does sufficient information exist to support these findings?
Inland determined the hydraulic conductivity (*k*) for five wells in both the shallow (2S, 3, 4S, 5S, and 6S) and deep zones (2D, 4D, 5D, 6D, and 7). The lowest *k* for the shallow zone was 1.64 gpd/ft^2 at monitoring well 4S (area showing highest concentration of contaminants) which is at the southeast corner of the former surface impoundment. The highest *k* for the shallow zone was 14.5 gpd/ft^2 at monitoring well 6S which is located at the southeast corner of the site (farthest well form the former lagoon). The average *k* value for the shallow zone being 6.27 gpd/ft^2. Using these *k* values, and effective porosity for the shallow zone of 0.18, and an

average horizontal gradient of 0.0067 ft/ft between monitoring wells 5S and 6S the calculated groundwater flow velocity for monitoring wells 4S and 6S are 2.98 ft/year and 26.4 ft/year, respectively. The average groundwater flow velocity for the shallow zone is 11.4 ft/year.

The lowest *k* for the deep zone was 5.6 gpd/ft^2 at monitoring well 4D(nested with 4S). The highest *k* for the deep zone was 47 gpd/ft^2 at monitoring well 6D (nested with 6S). The average *k* value for the deep zone being 15.86 gpd/ft^2. Using these *k* values, an effective porosity for the deep zone of 0.25, and an average horizontal flow gradient of 0.005 ft/ft between monitoring wells 5D and 6D the calculated groundwater flow velocity for monitoring wells 4D and 6D are 5.15 ft/year and 45.87 ft/year, respectively. The average groundwater flow velocity for the deep zone is 15.47 ft/year.

5.3 Does the report include an evaluation of the vertical gradient(s)? Yes. vertical flow direction(s)? Yes. rate(s) of vertical groundwater flow? Yes.

5.4 Does sufficient information exist to support these findings? Please explain.
The report contains a good table of vertical flow potential, using all the well clusters on site (2, 3, 4, 5, and 6). The results are given in a head difference not a vertical gradient. Well #2 cluster had an upward flow potential during the first half and a downward flow potential for the second half. Well #3 cluster had a downward flow potential during the first half and an upward flow potential during the second half. Well #4 had a downward flow potential during the first half and no flow for the second half. Well #5 and #6 clusters had downward flow potentials for both halves of 1999.

6.0 WELLBORE SILTATION

6.1 Has an evaluation of measured well depth compared to documented well depth been performed? Yes

6.2 Does the evaluation consider potential issues related wellbore siltation? Yes

6.3 If there is a problem, does it discuss maintenance options, contingencies? (i.e., redevelopment, replacement, etc.)
A comparison between measures total well depths verses as-built screen bottom elevations was performed in April 1999. Percentage of well screen occlusion was less than 5% for all wells. Therefore, no well redevelopment was necessary.

7.0 O&M ACTIVITIES OF MONITORING SYSTEM

7.1 Does the report discuss monitoring well operation and maintenance activities that were conducted during the subject year? Please explain.
All wells were inspected during both sampling events and appeared to be in good condition.

7.2.1 Does the report contain a narrative "update" section, which discusses any new well installation, exploratory drilling, or characterization activities that occurred during the subject year? Does it discuss any discrepancies in previous characterization studies? Please explain.
No such field work was performed by Inland in 1999.

8.0 ASSESSMENT/COMPLIANCE STATUS (APPROPRIATE FACILITIES)

8.1 How many hazardous waste constituents have been identified in the groundwater?
Several metal plating-related constituents.

8.2 Please list each identified constituent.
Manganese, Nickel, and Cadmium are definite hazardous constituents; Lead and Chromium have also possibly been released in the past. Other indictor parameters are a low pH and high zinc and sulfate levels within the plume.

8.3 Has the horizontal extent of contamination been determined? How is it presented in the report? Does it include concentrations of groundwater contaminants in each well?
Yes, the plume is concentrated between the MW-4 cluster and the southeast corner of the former impoundment. Trend graphs and isoconcetration maps provided by the facility are very helpful in determination if plume breakthrough has occurred in other downgradient regions from the pond. MW-4S still appears to be the only impacted well, though the GWEU is keeping a close watch on MW-4D and MW-9 and indicators of significant plume migration. The pH appears to have stabilized across the site, up from low values around 4 in the early 1990's.

8.4 Has the vertical extent of contamination been determined? How is it presented in the report? Does it include concentrations of groundwater contaminants in each well?
Groundwater contaminants seem to be confined to the upper, fine-grained alluvium between MW-4S and the former impoundment. The plume apparently is still bound by clean wells directly under the hotspot and just downgradient; both screened in the more permeable saturated alluvial material.

8.5 Has the rate of contamination migration been presented? How was it determined? Is it sufficient to estimate the rate of contaminant transport?
No rates have been estimated/calculated by the facility in recent years. If the groundwater velocity calculations are accurate, the expected contaminant migration rate would be less than 3 feet per year, at monitoring well #4S, in the fine-grained alluvium towards the 102 River.

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

July 26, 1999

James R. Myers, P.E.
Senior Project Engineer
O'Brien & Gere Engineers, Inc.
5000 Cedar Plaza Parkway, Suite 211
St. Louis, MO 63128

RE: Sampling and Analysis Plan, and 1998 Annual Groundwater Monitoring Report Approval for Inland Realty, Maryville, Missouri

Dear Mr. Myers:

The Missouri Department of Natural Resources (MDNR), Hazardous Waste Program's Groundwater Unit (GWU) has reviewed the Sampling and Analysis Plan (SAP), dated March 29, 1999, and the 1998 Annual Groundwater Monitoring Report, dated June 30, 1999, for Inland Realty, formerly Nixdorff-Lloyd Chain Company, in Maryville, Missouri.

The primary objective of a SAP is to document the procedures used in sampling and analysis of groundwater monitoring wells and related field work such that these procedures are done in a proper and consistent manner regardless of the personnel involved. Field personnel should be thoroughly familiar with the content of the SAP and are responsible for the adherence to the SAP procedures.

The GWU prepared a worksheet outlining the requirements for a complete and accurate SAP. A copy of this worksheet is enclosed. Overall, Inland Reality's SAP is a comprehensive document that contains all of the key elements required for an adequate SAP. Inland Realty has adequately addressed all of the concerns noted in MDNR's November 24, 1998, letter.

The purpose of the annual groundwater monitoring report is to comprehensively address the technical requirements of 40 CFR Part 264 Subpart F and the facility's post-closure permit. The annual report must be submitted to the MDNR by March 1 of each calendar year for the preceding calendar year.

The GWU prepared a worksheet outlining the requirements for a complete and accurate annual groundwater monitoring report. A copy of this worksheet is enclosed. Inland Realty's Annual Report is a comprehensive document that contains a majority of the items required to adequately assess the groundwater monitoring program at the facility. However, the annual report does not include a comparison between measured total well depths versus as-built screen bottom elevations. This information has been provided by Inland Realty in the past. All future annual groundwater monitoring reports must include a formal well screen occlusion analysis as specified in Section 2.2 of the revised SAP.

If you have any questions regarding the SAP or 1998 Annual Groundwater Monitoring Report comments, please feel free to contact me at (573) 751-3553.

Sincerely,

HAZARDOUS WASTE PROGRAM

Christine M. Kump
Environmental Engineer
Permits Section

CMK:bi

Enclosures

bc: Mr. Brian McCurren, HWP-Permits Section

1998 ANNUAL GROUNDWATER REPORT REVIEW
Prepared by
MISSOURI DEPARTMENT OF NATURAL RESOURCES
HAZARDOUS WASTE PROGRAM
GROUNDWATER UNIT

FACILITY: Inland Realty - Maryville, Missouri
ANNUAL REPORT SUBMISSION DATE: 6-30-99
DATE REVIEWED/REVIEWER: 7-12-99 Chris Kump
REGULATORY STATUS OF FACILITY: Interim Status - Assessment Monitoring

1.0 GROUNDWATER MONITORING SYSTEM DISCUSSION

1.1 Does the report contain a narrative discussion of the nature and evolution of the site groundwater monitoring system?
Report contains a good narrative of the history of groundwater monitoring, specifically the evolution from detection to assessment monitoring and all additions/detections of the monitoring program.

1.2 Does the report draw any conclusions regarding the adequacy of the monitoring system related to its' intended purpose?
Report concludes that current system adequately defines groundwater quality and conditions surrounding the former surface impoundment.

2.0 ARE THE FOLLOWING ITEMS CONTAINED IN THE ANNUAL REPORT:

2.1 Well location map? Yes.

2.2 Measured total depths of monitoring wells (at least annually)? No.

2.3 List of groundwater monitoring parameters? Yes.

2.4 Frequency of sampling for each parameter? Yes, monitoring wells 2S, 2D, 3, 3S, 3D, 4S, 4D, 5S, 5D and 9 are sampled quarterly and monitoring wells 6S, 6D and 7 are sampled annually. Wells sampled quarterly in 1998 will be reduced to semi-annual sampling in the future as specified in the facility's Post-Closure Permit.

3.0 FOR EACH QUARTERLY/SEMI-ANNUAL/ANNUAL (AS APPROPRIATE) SAMPLING EVENT AT THE FACILITY, ARE THE FOLLOWING ITEMS CONTAINED IN THE ANNUAL REPORT?

3.1 Static groundwater elevations? Yes.

3.2 Groundwater elevation contour maps? Yes.

.3 How many maps? Eight - four each for upper and lower saturated alluvium.

3.4 Analytical results for each groundwater monitoring parameter? Yes. Has the facility included the raw data from the laboratory, or does the facility simply present a summary of the data? Tabular summary provided in annual report, raw data with field log sheets submitted quarterly.

3.5 Statistical evaluation of groundwater monitoring results as per detection monitoring regulations, approved assessment monitoring plan, or in the case of permitted facilities, the compliance monitoring plan?
Not performed since the facility progressed into assessment monitoring. MDNR requested that Inland provide contaminant trend graphs instead. Facility has provided adequate trend graphs for each significant upgradient and down gradient well in its program.

4.0 DESCRIPTION OF HYDRAULIC ZONES

4.1 How many hydraulically distinct "zones" does the facility recognize (note: In many cases, a facility will report three or four different "zones"; however, only one or two distinct "zones" may exist)?
Two hydraulic zones are monitored at the site. Though they might not be distinct, there is clearly a separation in water levels seen in the well clusters. Another hydraulic zone, the stratigraphicaly lower saturated glacial till, is currently not monitored by Inland.

4.2 Are the groundwater elevation contour maps (if included) sufficient to characterize the groundwater flow direction(s) in each zone?
Yes-flow in both saturated zones clearly flows southeast towards the 102 River.

5.0 GROUNDWATER FLOW PARAMETERS

5.1 Does the report include an evaluation of the horizontal gradient(s)? Yes. horizontal flow direction(s)? Yes. rate(s) of horizontal groundwater flow? Yes.

5.2.1 Does sufficient information exist to support these findings?
Inland determined the hydraulic conductivity (*k*) for five wells in both the shallow (2S, 3, 4S, 5S, and 6S) and deep zones (2D, 4D, 5D, 6D, and 7). The lowest *k* for the shallow zone was 1.64 gpd/ft^2 at monitoring well 4S (area showing highest concentration of contaminants) which is at the southeast corner of the former surface impoundment. The highest *k* for the shallow zone was 14.5 gpd/ft^2 at monitoring well 6S which is located at the southeast corner of the site (farthest well form the former lagoon). The average *k* value for the shallow zone being 6.27 gpd/ft^2. Using these *k* values, and effective porosity for the shallow zone of 0.18, and an

average horizontal gradient of 0.0067 ft/ft between monitoring wells 5S and 6S the calculat groundwater flow velocity for monitoring wells 4S and 6S are 2.98 ft/year and 26.4 ft/year, respectively. The average groundwater flow velocity for the shallow zone is 11.4 ft/year.

The lowest *k* for the deep zone was 5.6 gpd/ft^2 at monitoring well 4D(nested with 4S). The highest *k* for the deep zone was 47 gpd/ft^2 at monitoring well 6D (nested with 6S). The average *k* value for the deep zone being 16.86 gpd/ft^2. Using these *k* values, an effective porosity for the deep zone of 0.25, and an average horizontal flow gradient of 0.0048 ft/ft between monitoring wells 5D and 6D the calculated groundwater flow velocity for monitoring wells 4D and 6D are 5.25 ft/year and 44.03 ft/year, respectively. The average groundwater flow velocity for the deep zone is 14.86 ft/year.

5.3 Does the report include an evaluation of the vertical gradient(s)? Yes. vertical flow direction(s)? Yes. rate(s) of vertical groundwater flow? Yes.

5.4 Does sufficient information exist to support these findings? Please explain.
The report contains a good table of vertical flow potential, using all the well clusters on site (2, 3, 4, 5, and 6). The results are given in a head difference not a vertical gradient. Well #2 cluster had an upward flow potential during the first, third, and fourth quarters and a downward flow potential for the second quarter. Well #3 cluster had a downward flow potential during the first, second, and third quarters and an upward flow potential during the fourth quarter. Well #4 and #5 clusters had downward flow potentials for all four quarters of 1998. Well #6 clust had no vertical flow potential for the first quarter, a slight downward flow potential for the second and third quarters, and a very slight upward flow potential for the fourth quarter.

6.0 WELLBORE SILTATION

6.1 Has an evaluation of measured well depth compared to documented well depth been performed? No

6.2 Does the evaluation consider potential issues related wellbore siltation? No

6.3 If there is a problem, does it discuss maintenance options, contingencies? (i.e., redevelopment, replacement, etc.)
However, the annual report did not include a comparison between measured total well depths versus as-built screen bottom elevations. This information has been provided in the past. The facility will be asked to continue a formal well screen occlusion analysis at least once per year as specified in Section 2.2 of the revised SAP.

7.0 O&M ACTIVITIES OF MONITORING SYSTEM

7.1 Does the report discuss monitoring well operation and maintenance activities that were conducted during the subject year? Please explain.
No such field work was performed by Inland in 1998.

7.2.1 Does the report contain a narrative "update" section, which discusses any new well installation, exploratory drilling, or characterization activities that occurred during the subject year? Does it discuss any discrepancies in previous characterization studies? Please explain.
No such field work was performed by Inland in 1998.

8.0 ASSESSMENT/COMPLIANCE STATUS (APPROPRIATE FACILITIES)

8.1 How many hazardous waste constituents have been identified in the groundwater?
Several metal plating-related constituents.

8.2 Please list each identified constituent.
Manganese, Nickel, and Cadmium are definite hazardous constituents; Lead and Chromium have also possibly been released in the past. Other indictor parameters are a low pH and high zinc and sulfate levels within the plume.

8.3 Has the horizontal extent of contamination been determined? How is it presented in the report? Does it include concentrations of groundwater contaminants in each well?
Apparently, the plume is concentrated between MW-4 and the southeast corner of the former impoundment. Trend graphs provided by the facility are very helpful in determination if plume breakthrough has occurred in other downgradient regions from the pond. MW-4S still appears to be the only impacted well, though the GWEU is keeping a close watch on MW-4D and MW-9 and indicators of significant plume migration. The pH appears to have stabilized across the site, up from low values around 4 in the early 1990's.

8.4 Has the vertical extent of contamination been determined? How is it presented in the report? Does it include concentrations of groundwater contaminants in each well?
Groundwater contaminants seem to be confined to the upper, fine-grained alluvium between MW-4S and the former impoundment. The plume apparently is still bound by clean wells directly under the hotspot and just downgradient; both screened in the more permeable saturated alluvial material.

8.5 Has the rate of contamination migration been presented? How was it determined? Is it sufficient to estimate the rate of contaminant transport?
No rates have been estimates/calculated by the facility in recent years. If the groundwater velocity calculations are accurate, the expected contaminant migration rate would be less than 3 feet per year, at monitoring well #4S, in the fine-grained alluvium towards the 102 River.

9.0 REMARKS

The annual report did not include an annual comparison of measured total well depths and as-built well depths. This data is integral for evaluation of well bore siltation and ultimately the ability of Inland's groundwater system to provide reliable and representative groundwater samples. This information has been provided in the past.

MDNR - GROUNDWATER ENFORCEMENT UNIT (GWEU)
1997 ANNUAL GROUNDWATER REPORT REVIEW

FACILITY: Nixdorff Lloyd - Maryville, Missouri
ANNUAL REPORT SUBMISSION DATE: 1-27-98
DATE REVIEWED/REVIEWER: 1-30-98 Chris Kump
REGULATORY STATUS OF FACILITY: Interim Status - Assessment Monitoring

1.0 GROUNDWATER MONITORING SYSTEM DISCUSSION

1.1 Does the report contain a narrative discussion of the nature and evolution of the site groundwater monitoring system?
Report contains a good narrative of the history of groundwater monitoring, specifically the evolution from detection to assessment monitoring and all additions/detections of the monitoring program.

1.2 Does the report draw any conclusions regarding the adequacy of the monitoring system related to its' intended purpose?
Report concludes that current system adequately defines groundwater quality and conditions surrounding the former surface impoundment.

2.0 ARE THE FOLLOWING ITEMS CONTAINED IN THE ANNUAL REPORT:

2.1 Well location map? On potentiometric maps.

Measured total depths of monitoring wells (at least annually)? No.

2.3 List of groundwater monitoring parameters? Yes.

2.4 Frequency of sampling for each parameter? Yes - all quarterly.

3.0 FOR EACH QUARTERLY/SEMI-ANNUAL/ANNUAL (AS APPROPRIATE) SAMPLING EVENT AT THE FACILITY, ARE THE FOLLOWING ITEMS CONTAINED IN THE ANNUAL REPORT?

3.1 Static groundwater elevations? Yes.

3.2 Groundwater elevation contour maps? Yes.

3.3 How many maps? Eight - four each for upper and lower saturated alluvium.

3.4 Analytical results for each groundwater monitoring parameter? Yes. Has the facility included the raw data from the laboratory, or does the facility simply present a summary of the data?
Tabular summary provided in annual report, raw data with field log sheets submitted quarterly.

3.5 Statistical evaluation of groundwater monitoring results as per detection monitoring regulations, approved assessment monitoring plan, or in the case of permitted facilities, the compliance monitoring plan?
Not performed since the facility progressed into assessment monitoring. MDNR requested that NL provide contaminant trend graphs instead. Facility has provided adequate trend graphs for each significant upgradient and down gradient well in its program.

4.0 DESCRIPTION OF HYDRAULIC ZONES

4.1 How many hydraulically distinct "zones" does the facility recognize (note: In many cases, a facility will report three or four different "zones"; however, only one or two distinct "zones" may exist)?
Two hydraulic zones are monitored at the site. Though they might not be distinct, there is clearly a separation in water levels seen in the well clusters. Another hydraulic zone, the stratigraphically lower saturated glacial till, is currently not monitored by NL.

4.2 Are the groundwater elevation contour maps (if included) sufficient to characterize the groundwater flow direction(s) in each zone? Yes-flow in both saturated zones clearly flows southeast towards the 102 River.

5.0 GROUNDWATER FLOW PARAMETERS

5.1 Does the report include an evaluation of the horizontal gradient(s)? Yes. horizontal flow direction(s)? Yes. rate(s) of horizontal groundwater flow? Yes.

5.2 Does sufficient information exist to support these findings?
NL determined a hydraulic conductivity for well #4S of 1.72 GPD/ft^2. Estimated effective porosity for the upper saturated alluvium is 0.25. NL calculated a horizontal gradient of 0.0061 ft/ft between wells 5S and 6S, both screened in the upper alluvium. NL calculated a velocity from this gradient at 2.06 feet per year, which seems reasonable given the very slow contaminant plume migration.

5.3 Does the report include an evaluation of the vertical gradient(s)? Yes. vertical flow direction(s)? Yes. rate(s) of vertical groundwater flow? Yes.

5.4 Does sufficient information exist to support these findings? Please explain.
The report contains a good table of vertical flow potential, using all the well clusters on site (2, 3, 4, 5, 6). The results are given in a head difference not a vertical gradient. Well clusters #4 and #5, have downward gradients, with the #5 (upgradient) cluster exhibiting a strong downward flow potential. The #2 cluster showed upward flow potential for all four quarters. The #3 cluster exhibited a downward flow potential

during the first quarter and an upward flow potential during the second, third, and fourth quarters. The #6 well cluster showed a downward flow potential for third quarter while the remaining three quarters showed no flow potential between wells.

6.0 WELLBORE SILTATION

6.1 Has an evaluation of measured well depth compared to documented well depth been performed? No

6.2 Does the evaluation consider potential issues related wellbore siltation? No

6.3 If there is a problem, does it discuss maintenance options, contingencies? (i.e. redevelopment, replacement, etc.)
However, the annual report did not include a comparison between measured total well depths versus as-built screen bottom elevations. This information has been provided in the past. The facility will be asked to continue a formal well screen occlusion analysis at least once per year.

7.0 O&M ACTIVITIES OF MONITORING SYSTEM

Does the report discuss monitoring well operation and maintenance activities that were conducted during the subject year? Please explain. No such filed work was performed by NL in 1997.

7.2 Does the report contain a narrative "update" section which discusses any new well installation, exploratory drilling, or characterization activities that occurred during the subject year? Does it discuss any discrepancies in previous characterization studies? Please explain. No such field work was performed by NL in 1997.

8.0 ASSESSMENT/COMPLIANCE STATUS (APPROPRIATE FACILITIES)

8.1 How many hazardous waste constituents have been identified in the groundwater?
Several metal plating-related constituents.

8.2 Please list each identified constituent.
Manganese, Nickel, and Cadmium are definite hazardous constituents. Lead and Chromium have also possibly been released in the past. Other indictor parameters are a low pH and high zinc and sulfate levels within the plume.

8.3 Has the horizontal extent of contamination been determined? How is it presented in the report? Does it include concentrations of groundwater contaminants in each well?
Apparently, the plume is concentrated between MW-4 and the southeast corner of the former impoundment. Trend graphs provided by the facility are very helpful in determination if plume breakthrough has occurred in other downgradient regions from the pond. MW-4s still appears to be the only impacted well, though the GWEU is keeping a close watch on MW-4D and MW-9 and indicators of significant plume migration. The pH appears to have stabilized across the site, up from low values around 4 in the early 1990's.

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8.5 Has the rate of contamination migration been presented? How was it determined? Is it sufficient to estimate the rate of contaminant transport?
No rates have been estimates/calculated by the facility in recent years. If the groundwater velocity calculations are accurate, the expected contaminant migration rate would be less than 2 feet per year in the fine-grained alluvium towards the 102 River.

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MDNR - GROUNDWATER ENFORCEMENT UNIT (GWEU)
1996 ANNUAL GROUNDWATER REPORT REVIEW

ITY: Nixdorff Lloyd - Maryville, Missouri
ANNUAL REPORT SUBMISSION DATE: 3-17-97
DATE REVIEWED/REVIEWER: 3-20-97 Chris Kump
REGULATORY STATUS OF FACILITY: Interim Status - Assessment Monitoring

1.0 GROUNDWATER MONITORING SYSTEM DISCUSSION

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The report contains a good table of vertical flow potential, using all the well clusters on site (2, 3, 4, 5, 6). The results are given in a head difference not a vertical gradient. The well clusters numbered 4, 5, and 6 all have downward gradients, with the #5 (upgradient) cluster exhibiting a strong downward flow potential. The #2 cluster showed upward flow potential during the first, third, and fourth quarters and a downward flow potential during second quarter. The #3 cluster exhibited a downward flow potential during the first, second, and third quarters and an upward flow potential during the fourth quarter.

6.0 WELLBORE SILTATION

6.1 Has an evaluation of measured well depth compared to documented well depth been performed? No

6.2 Does the evaluation consider potential issues related wellbore siltation? No

6.3 If there is a problem, does it discuss maintenance options, contingencies? (i.e. redevelopment, replacement, etc.)
Copies of first quarter field log sheets were provided as an appendix to the quarterly submittal, containing the recorded well depths. However, the annual report did not include a comparison between measured total well depths versus as-built screen bottom elevations. This information has been provided in the past. The facility will be asked to continue a formal well screen occlusion analysis at least once per year.

7.0 O&M ACTIVITIES OF MONITORING SYSTEM

7.1 Does the report discuss monitoring well operation and maintenance activities that were conducted during the subject year? Please explain. Yes, the tab on the hinged metal lid of GMW#9 was repaired between the first and second quarters of 1996.

7.2 Does the report contain a narrative "update" section which discusses any new well installation, exploratory drilling, or characterization activities that occurred during the subject year? Does it discuss any discrepancies in previous characterization studies? Please explain. No such field work was performed by NL in 1996.

8.0 ASSESSMENT/COMPLIANCE STATUS (APPROPRIATE FACILITIES)

8.1 How many hazardous waste constituents have been identified in the groundwater?
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No rates have been estimates/calculated by the facility in recent years. If the groundwater velocity calculations are accurate, the expected contaminant migration rate would be less than 2 feet per year in the fine-grained alluvium towards the 102 River.

9.0 REMARKS

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APPENDIX J

DEPARTMENT & INLAND REALTY CORRESPONDENCE

STATE OF MISSOURI Bob Holden, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.state.mo.us

MEMORANDUM

DATE: November 12, 2002

TO: Joe L. Gassner, Chief
Communications and Financial Assurance Unit
Permits Section, Hazardous Waste Program

THROUGH: Robert K. Morrison, P.E., Chief
Permits Section, Hazardous Waste Program

FROM: Brian McCurren, Environmental Engineer
Permits Section, Hazardous Waste Program

SUBJECT: Post-Closure Certification Final Approval for Inland Realty Company; Former Nixdorff-Lloyd Company Surface Impoundment; Maryville, Missouri

Inland Realty has submitted its post-closure certification report for their closed surface impoundment located in Maryville, Missouri. The post-closure certification document was dated August 16, 2002. Susan Littman Schulte, Manager for Inland Realty Enterprises, L.L.C., and Ronald S. Krusie, an independent registered professional engineer licensed in Missouri, signed the certification. The Hazardous Waste Program inspected the facility on October 31, 2002, and no unsatisfactory items were identified at the closed surface impoundment.

The facility has met all requirements of their March 5, 1999, permit as modified on June 17, 2002, and we now consider the permit terminated. The Land Disposal/PCB Unit accepts this certification and requests that Inland Realty be notified of our acceptance and released from financial assurance requirements.

Please add a statement in their notification letter that the former impoundment area is restricted from disturbance unless a request is submitted and approved by the department.

BM:sw

c: Lyle Crocker, HWP-Enforcement Section
Kansas City Regional Office
Christine Kump-Mitchell, HWP-Permits Section

Inland Realty TSD

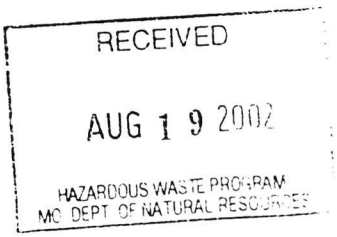
INLAND REALTY ENTERPRISES, L.L.C.

555 N. New Ballas Road, Suite 230
St. Louis, MO 63141-6886

tel 314.872.8500
fax 314.872.8517

August 16, 2002

VIA CERTIFIED MAIL
RETURN RECEIPT REQUESTED



Mr. Brian McCurren
Missouri Department of Natural Resources
Hazardous Waste Program, Permits Section
1738 Elm Street
P.O. Box 176
Jefferson City, MO 65102

Re: Inland Realty Enterprise, L.L.C./Maryville, MO Property
Certification of Completion of Post Closure Care
Permit #MOD099238784 (the "Permit")

Dear Mr. McCurren:

This letter is the certificate of completion of post-closure care for the Inland Realty Enterprise, L.L.C. (Inland) Maryville, Missouri property, requested in your letter to Peter Strassner dated June 17, 2002.

Facility Description

The site is situated in Northwest Missouri on the eastern edge of the city of Maryville, Missouri. The street address is 2500 East First Street (Highway 136). The site comprises approximately 18.8 acres. Of this, the current tenant, a chain manufacturing facility, uses approximately 6.9 acres. The former lagoon area encompassed approximately 1.4 acres. The surface water area of the lagoon was approximately 0.75 acres. The chain manufacturing building encloses approximately 128,000 square feet. The building continues to be used for the manufacture of carbon steel chain.

Brief History

The surface impoundment was constructed in approximately 1970. From the early 1970s to October 1981, the surface impoundment received spent pickling waste from the production of low-carbon steel chain. The surface impoundment was classified by the United States Environmental Protection Agency (USEPA) and the Missouri Department of Natural Resources (MDNR) as a treatment, storage or disposal facility. The pickling operation was

In January 2002, notification was given by MDNR of an additional 45-day public comment period. The 45-day comment period began on March 20, 2002 and ended May 6, 2002. In a letter from MDNR dated June 17, 2002 to Mr. Peter Strassner, Esquire (received June 19, 2002), MDNR approved of Inland's request to modify the Permit, as follows:

> The permit modification is now final and the department considers Inland's post-closure care activities including groundwater monitoring completed at this time. Likewise, the effectiveness period of the Hazardous and Solid Waste Amendments permit is modified to end as of the date of this letter. In accordance with 40 CFR 264.120, incorporated by reference in 10 CSR 25-7.264(1), Inland shall submit within 60 days of receipt of this letter, the certificate of completion of post-closure care. The certification shall be signed by the owner or operator and an independent registered professional engineer licensed in Missouri. Following approval of the certification the department will issue an acceptance of the certification and a release from financial assurance.

Well Abandonment Activities

Following notification of MDNR's approval of the Permit modification, the groundwater monitoring wells and piezometers were abandoned. Well abandonment procedures began the week of July 9, 2002. Nodaway Contracting of Maryville, Missouri was retained to remove the concrete pads installed around the monitoring wells. The well pads were removed by picking them up with a front-end loader. If the well began to be pulled while lifting the pad, it was cut off. The concrete pads were disposed of as construction rubble fill. The day after the pads were removed, Layne-Western of Kansas City, Kansas abandoned the monitoring wells and piezometers. The wells and piezometers were abandoned by making a hole in the bottom of the well, filling the well with a cement & bentonite grout mixture, then pulling the well. If a well broke while pulling, the well was pushed back down the hole until it was a minimum of 3 feet below grade and filled with grout to two feet below grade. Additional grout was added as necessary using a tremie pipe to bring the top of the grout to 2 feet below ground surface.

The top two feet of the borehole was filled with topsoil obtained from Nodaway Contracting. The ground surface was restored with topsoil slightly mounded over the former well and piezometer locations. No soils were removed from boreholes. The PVC well materials were steam cleaned and placed with the plant general refuse. The decontamination waters were contained in a 55-gallon drum and analyzed for metals, cyanide and hexavalent chromium. The analytical results were below Permit groundwater protection standards. With approval of MDNR, the decontamination waters were disposed of in the plant pretreatment system.

Copies of the decontamination water analytical results are included as Exhibit 2. A copy of the well abandonment variance form is included as Exhibit 3. Well abandonment forms were submitted to MDNR by Layne-Western. Copies of the forms as submitted to MDNR are included as Exhibit 4. Also included is a July 24, 2002 letter from MDNR noting the Site Address, Well Numbers and associated State Well Number for the abandoned monitoring wells and piezometers, Exhibit 5. Copies of the post cards with the certification numbers are included as Exhibit 6.

O'BRIEN & GERE
ENGINEERS, INC.

June 4, 2001

Ms. Chris Kump
Missouri Department of Natural Resources
Hazardous Waste Program
1738 Elm Street (Lower Level)
P.O. Box 176
Jefferson City, MO 65102

Re: Inland Realty/Nixdorff
Permit No.: MOD099238784

File: 3050.005 #2

Dear Ms. Kump:

We are writing to inform you that Severn Trent Laboratories (Severn Trent) has been selected to perform the analysis on the water samples collected for the above-referenced site. In interviewing Severn Trent, they can attain the detection limits required under the permit without dilution or concentration of the sample. We will be using their St. Louis facility.

We are also taking this opportunity to inform you the next semiannual sampling event will take place starting the week of June 18, 2001.

Should you have any questions, please contact me at our office.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

William E. Wright /jg

William E. Wright, R.G.
Hydrogeologist

WEW:adg

cc: Millard Cohen – Inland Realty, LLC
Peter Strassner, Esq. – Thompson-Coburn

O'Brien & Gere Engineers, Inc., an O'Brien & Gere company
12250 Weber Hill Road / St. Louis, MO 63127
(314) 842-4550 / FAX (314) 842-3266 • http:// www.obg.com
... and offices in major U.S. cities

O'BRIEN & GERE
ENGINEERS, INC.

February 27, 2001

Mr. Art Gronoer
Chief, Permits Section
Missouri Department of Natural Resources
Hazardous Waste Program
1738 Elm Street (Lower Level)
P.O. Box 176
Jefferson City, MO 65102

Re: Inland Realty/Nixdorff

File: 3050.005

Dear Mr. Gronoer:

We are sending herewith three copies of *2000 Annual Ground Water Compliance Monitoring; Inland Realty Enterprises, L.L.C., Maryville, Missouri* for your approval. The report fulfills the requirements of Missouri Hazardous Waste Management Facility Permit MOD099238784. This report is for the fourth and fifth sampling events under the permit.

The sixth sampling event is anticipated to occur during May 2001. Should the analytical results of the sixth sampling event remain below permit-established ground water protection standards, Inland Realty will be seeking to terminate ground water sampling as allowed under Permit Condition II-C and as agreed upon in additional correspondence with the Missouri Department of Natural Resources (MDNR). (See the April 13, 1999 letter from Millard Cohen to John H. Young (MDNR); the April 22, 1999 letter from Millard Cohen to Stephen Mahfood (MDNR); the April 28, 1999 letter from John H. Young to Millard Cohen; and the May 19, 1999 letter from Stephen Mahfood to Millard Cohen, copies of which are attached for your convenience.)

Should you have any questions, please contact me at our office.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Robert J. Januska, P.E.
Vice President

WEW:jg

Attachments

cc: U.S. Environmental Protection Agency (2 Copies)
Mr. Millard Cohen – Nixdorff-Krein (1)
Mr. Peter Strassner, Esq. – Thompson Coburn (1)
Mr. Al Macali, Jr. – Laclede Chain (1)

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and offices in major U.S. cities

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Millard S. Cohen
President
Nixdorff-Krein Industries, Inc.
760 Office Parkway
P.O. Box 419050
St. Louis, MO 63141

RE: Inland Realty Company, Post-Closure Permit
EPA ID: MOD099238784

Dear Mr. Cohen:

Inland Realty company was recently issued a post-closure permit, dated March 15, 1999, for the former Nixdorff-Lloyd site in Maryville, Missouri. Attached to the permit was a formal response to the comments received during the public comment period. In Comment #7, the Permittee requested the right to petition for termination of the permit if no exceedance of the groundwater protection standard occurs for a period of three years. The Missouri Department of Natural Resources' (MDNR) response incorrectly referenced 40 CFR 264.96(c), which allows for termination of groundwater monitoring following the end of the compliance period. MDNR supports Inland Realty's right to petition for termination of groundwater monitoring and the permit if no exceedances of the groundwater protection standards occur for three years. Attached is the Response to Comments, which has been revised to include the procedure for applying for a modification to terminate post-closure.

If you have any questions regarding this letter, please contact Mr. Brian McCurren, Environmental Engineer, at (573) 751-3553.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

John A. Young
Director

C: Ms. Patricia Murrow, Environmental Engineer, U.S. EPA Region VII
MDNR, Kansas City Regional Office

Inland Realty Company

PO Box 419050
St. Louis, MO 63141-9050

tel 314/872-8
fax 314/872-8

April 22, 1999

Mr. Stephen Mahfood, Director
Missouri Department of Natural Resources
PO Box 176
Jefferson City, MO 65102-0176

RE: Inland Realty Company, Post-Closure Permit EPA ID: MOD099238784

Dear Mr. Mahfood:

While we are in the process of sending the Missouri Department of Natural Resources (MDNR) check for the remaining $9,000 covering the fee associated with the above referenced permit, we wish protest the permit fee of $10,000 which is based on a permit life of ten years.

It is understood by all parties concerned that in three years, as long as there are no statistically significant exceedences of the groundwater protection standards in the permit, and provided the reques contains all pertinent information and satisfies all procedural requirements, MDNR will grant our request to terminate all monitoring. In addition, MDNR will favorably entertain our request to terminate the permit as a whole at that time as long as the proper institutional controls are put into place.

Based on the expected duration of the permit (three years), we believe that MDNR (1) should allow Inland to pay an additional $2,000 at this time ($1,000 has already been paid) and $1,000 per year for each year the permit is in effect after three years or, (2) if MDNR insists on $10,000 up front, Inland should be given a rebate if, as expected, the permit is terminated before its ten year expiration date.

Inland requested that the future monitoring of the site be conducted pursuant to an administrative consent order (which would have entailed no fees), rather than a permit. MDNR acknowledged such an order could have been used, but indicated a preference for the permit, which it had already started drafting. Inland, based upon assurances from MDNR that its concerns could be adequately addressed in a permit, and because it wished to cooperate with MDNR, agreed to the issuance of a permit. Yet, as it presently stands, Inland will effectively be penalized in the approximate amount of $7,000 by virtue of its cooperation with MDNR. That is certainly not what Inland had expected when it cooperated with MDNR, nor do we believe that is fair. Your staff has been helpful but, we sense feels constrained in its ability to rectify this situation.

We request your intervention in this matter to determine if a more equitable resolution can be achieved.

Sincerely,
INLAND REALTY COMPANY

Millard S. Cohen
President

cc: Mr. Brian McCurren

Thank you for your patience in this matter. If you have any questions regarding this letter, please contact Mr. Brian McCurren, Environmental Engineer, Hazardous Waste Program, at (573) 751-3553.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

John A. Young
Director

JAY:bmb

Enclosure

c: Ms. Patricia Murrow, Environmental Engineer, U.S. EPA Region VII
MDNR, Kansas City Regional Office

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF THE DIRECTOR
P.O. Box 176 Jefferson City, MO 65102-0176

Post-It™ brand fax transmittal memo 7671	# of pages ▸ 2
To Jim Myers	From Millard Cohen
Co. O'Brien + Gere	Co. NKI
Dept.	Phone # 872-8500
Fax # 842-3266	Fax # 872-8517

MAY 19 1999

Mr. Millard S. Cohen
President
Inland Realty Company
P. O. Box 419050
St. Louis, MO 63141-9050

RE: Inland Realty Company, Post-Closure Permit
EPA ID: MOD099238784

Dear Mr. Cohen:

The Missouri Department of Natural Resources (MDNR) is in receipt of your letter dated April 22, 1999 regarding permit fees for the above-referenced permit. MDNR appreciates your cooperation in paying the remaining amount due on the fee.

MDNR understands that obtaining and operating under a post-closure permit can be time-consuming and burdensome. However, in the case of the former Nixdorff-Lloyd site, a post-closure permit is appropriate. It has been the policy of the MDNR, Hazardous Waste Program (HWP) to issue post-closure permits to facilities whose on-site contamination results from a Resource Conservation and Recovery Act (RCRA) regulated unit, as opposed to a solid waste management unit (SWMU). At the former Nixdorff-Lloyd site, the release has been from the RCRA unit, the closed surface impoundment.

Hazardous waste permits are issued for a period of 10 years. In accordance with Missouri regulations 10 CSR 25-7.270 (2) (C) 1. A., the permit fee is $1000 plus $1000 for every year the permit is in effect beyond the first year. The HWP has expressed its intent to favorably entertain a modification to terminate the permit after three years. Until that time and depending on approval of the modification, the permit is considered to be in effect for the full 10-year period. However, the above-referenced regulation language suggests that if the permit period is shortened, part of the original permit fee may be rebated. MDNR will consider this in the event that the modification is approved.

Chris

STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

November 24, 1998

James R. Myers, P.E.
Senior Project Engineer
O'Brien & Gere Engineers, Inc.
5000 Cedar Plaza Parkway, Suite 211
St. Louis, MO 63128

RE: Sampling and Analysis Plan (SAP) Approval and Comment Letter for Inland Realty, Maryville, Missouri

Dear Mr. Myers:

The Missouri Department of Natural Resources (MDNR), Hazardous Waste Program's Groundwater Unit (GWU) has reviewed the Sampling and Analysis Plan (SAP) for Inland Realty, formerly Nixdorff-Lloyd Chain Company, in Maryville, Missouri, dated November 9, 1998.

The primary objective of a SAP is to document the procedures used in sampling and analysis of groundwater monitoring wells and related field work such that these procedures are done in a proper and consistent manner regardless of the personnel involved. Field personnel should be thoroughly familiar with the content of the SAP and are responsible for the adherence to the SAP procedures.

The SAP is a dynamic document that reflects current groundwater monitoring conditions at the site. The SAP must be periodically updated to reflect changes in the groundwater monitoring system, such as: changes in number of monitoring wells, monitoring well sampling frequency, and the parameters to be sampled.

The GWU prepared a worksheet outlining the requirements for a complete and accurate SAP. A copy of this worksheet is enclosed. Overall, Inland Reality's SAP is a comprehensive document that contains all of the key elements required for an adequate SAP. However, there are a few items that must be addressed.

If you have any questions regarding the SAP comments, please feel free to contact me at (573) 751-3553.

Sincerely,

HAZARDOUS WASTE PROGRAM

Christine M. Kump
Environmental Engineer
Permits Section

CMK:la

Enclosure

File - Gbl M - Inland Rea

O'BRIEN & GERE
ENGINEERS, INC.

October 30, 1998

Ms. Chris Kump
Missouri Department of Natural Resources
Hazardous Waste Program
1738 East Elm Street (Lower Level)
PO Box 176
Jefferson City, MO 65102-0176

Re: Inland Realty RCRA Permit Compliance Monitoring

File: 3050.005

Dear Chris:

The purpose of this letter is to confirm our telephone conversation of October 27, 1998 regarding the schedule for compliance monitoring sampling at the Inland Realty site in Maryville, MO (Missouri Hazardous Waste Management Facility Part I Permit Number MOD099238784). As we discussed, the first semi-annual compliance monitoring event under the permit will occur during November 1998. The report for this event will be due on March 1, 1999. Subsequent semi-annual compliance monitoring events will occur during April/May and October/November of each year. We also agreed to send a draft of the revised Sampling and Analysis Plan (SAP) as required under the permit for your review and comment prior to the November 1998 sampling event. We anticipate sending you the revised SAP on approximately November 6, 1998.

We appreciate the cooperation of the Missouri Department of Natural Resources (MDNR) regarding this matter. Please contact me if you have any questions regarding this letter. We look forward to your comments on the revised SAP.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

James R. Myers, PE
Senior Project Engineer

JRM:bah
cc: Millard Cohen - Nixdorff-Krein Industries
Peter S. Strassner - Thompson Coburn

O'Brien & Gere Engineers, Inc., an O'Brien & Gere Company
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. . . and offices in major U.S. cities

O'BRIEN & GERE
ENGINEERS, INC.

February 6, 1998

Ms. Chris Kumpf
Missouri Department of Natural Resources
Hazardous Waste Program
PO Box 176
Jefferson City, MO 65102-0176

Re: Nixdorff-Lloyd, Maryville, MO

File: 3050.005

Dear Ms. Kumpf:

Per the request in the letter from R. Bruce Stuart dated February 3, 1998, and the telephone conference call of February 5, 1998, we are writing to confirm resolution of the discharge of purge water during ground water monitoring at the former Nixdorff-Lloyd facility in Maryville, Missouri.

In O'Brien & Gere's response to the MDNR Operation and Maintenance Inspection Report dated September 16, 1997, we stated that we were pursuing options as to the proper discharge of purge waters from the ground water monitoring wells during the sampling events. Prior to the fourth quarter sampling event of 1997, the discharge issue was resolved by reaching an agreement with Laclede Chain Co. that allows purge waters to be discharged to Laclede Chain Co.'s pretreatment system. During the fourth quarter 1997 sampling event, purge waters were discharged to the Laclede Chain Co. pretreatment system. Future sampling events will also discharge purge waters to the pretreatment system.

Should you have any questions please do not hesitate to contact us.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

James R. Myers, PE
Senior Project Engineer

WEW:bah
cc: Millard Cohen - Nixdorff-Krein Industries

O'Brien & Gere Engineers, Inc., an O'Brien & Gere Company
5000 Cedar Plaza Pkwy. / Suite 211 / St. Louis, MO 63128 / (314) 842-4550 FAX (314) 842-3266
and offices in major U.S. cities

If you have any questions concerning the groundwater monitoring issues at Nixdorff-Krein, please contact Ms. Chris Kump, of my staff, at (573) 751-3553.

Sincerely,

HAZARDOUS WASTE PROGRAM

R. Bruce Stuart, P.E., R.G.
Chief, Groundwater Unit
Permits Section

RBS:ckb

and observation of damaged or irregular samples are documented by ATAS on the chain of custody record that is sent with the samples. Any problems noted on the chain of custody are also conveyed to the lab's client via a telephone call. Identification of all QC sample results are included with the respective analytical reports issued by ATAS.

During the next quarterly sampling event, a more secure method to attach the aluminum tags to the well cap will be used. As well, the four outer protective casings that were rusty will be painted.

Annual reports have not included a comparison between measured well depths versus well depths. While the measurements of well depths are checked annually, there has never been an issue over the years of well screen occlusion. We do not expect this to be an issue in the future. However, well screen occlusions will continue to be monitored on an annual basis.

The 1997 and subsequent annual reports will contain a table that includes:

- Top of casing elevation
- Total as-built well depth
- Screened elevations
- Filter pack elevations
- Type of lithology screened.

It is anticipated that this correspondence and updated SAP addressed MDNR's current concerns. Should you have any questions or require further clarification, please do not hesitate to contact us. Thank you for your consideration.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Lisa S. Douglas

Lisa S. Douglas, P.E., R.G.
Senior Project Engineer

LSD:bah
Enclosure
cc: Millard Cohen - Nixdorff-Krein Industries

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The deficiencies regarding the SAP content, Annual Report content, physical well integrity, and field sampling procedures are self-explanatory in the body of the report. The manner of purged well water disposal has not been resolved and should be approved by the MDNR's Water Pollution Control Program, as outlined in the report.

Please submit to the HWP's Groundwater Unit, in the Permits Section, within 30 days of receipt of this letter, a response and/or a schedule of responses to the groundwater monitoring program deficiencies summarized by the O&M report on pages 26-30.

If you have any questions, please do not hesitate to contact Ms. Chris Kump, of my staff, at (573) 751-3553.

Sincerely,

HAZARDOUS WASTE PROGRAM

R. Bruce Stuart, P.E., R.G.
Chief, Groundwater Unit
Permits Section

RBS:ckb

Enclosure

c: Mr. Bill Pedicino, U.S. EPA Region VII
MDNR, Kansas City Regional Office

STATE OF MISSOURI Mel Carnahan, Governor • David A. Shorr, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

DATE: August 7, 1997

TO: Bill Duley, R.G., Chief, Environmental Geology Section
Division of Geology and Land Survey

FROM: R. Bruce Stuart, P.E., R.G., Chief, Groundwater Unit RBS
Permits Section, Hazardous Waste Program

SUBJECT: Nixdorff-Lloyd Chain Company, Maryville, Missouri
Operation and Maintenance Inspection Report

The Operation and Maintenance Inspection (O&M) Report for Nixdorff-Lloyd Chain Company, Maryville, Missouri, has been completed. A final copy of the report is being transmitted with this memo for your information.

If you have any questions, please call Chris Kump, of my staff, at (573) 751-3553.

RBS:ckb

Attachment

c: Diana Travis, DGLS, Hazardous Waste Unit